March 24, 1925. 1,531,041

H. S. STINSON

ADDING MACHINE

Filed July 23, 1924 5 Sheets-Sheet 1

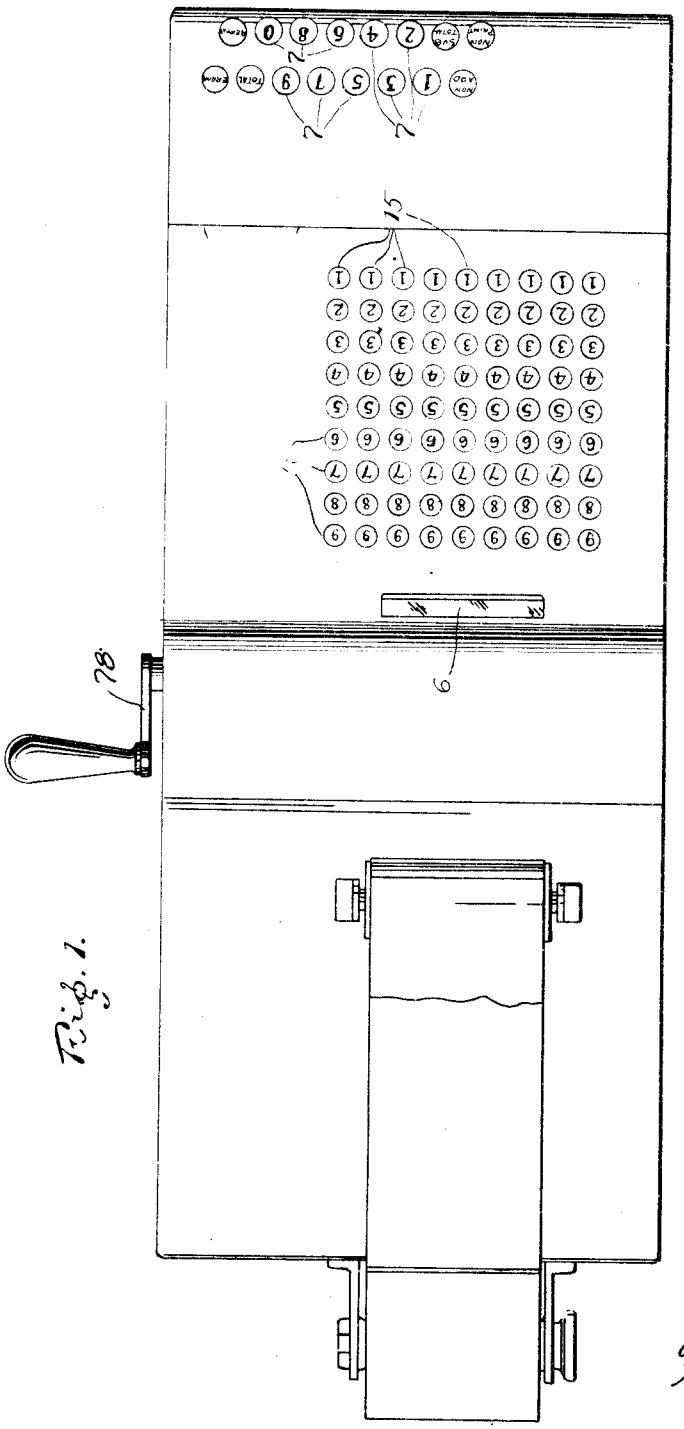


Fig. 1.

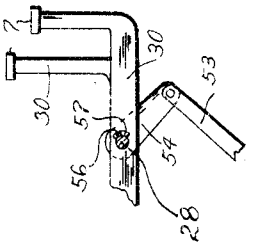


Fig. 2.

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ADDING MACHINE

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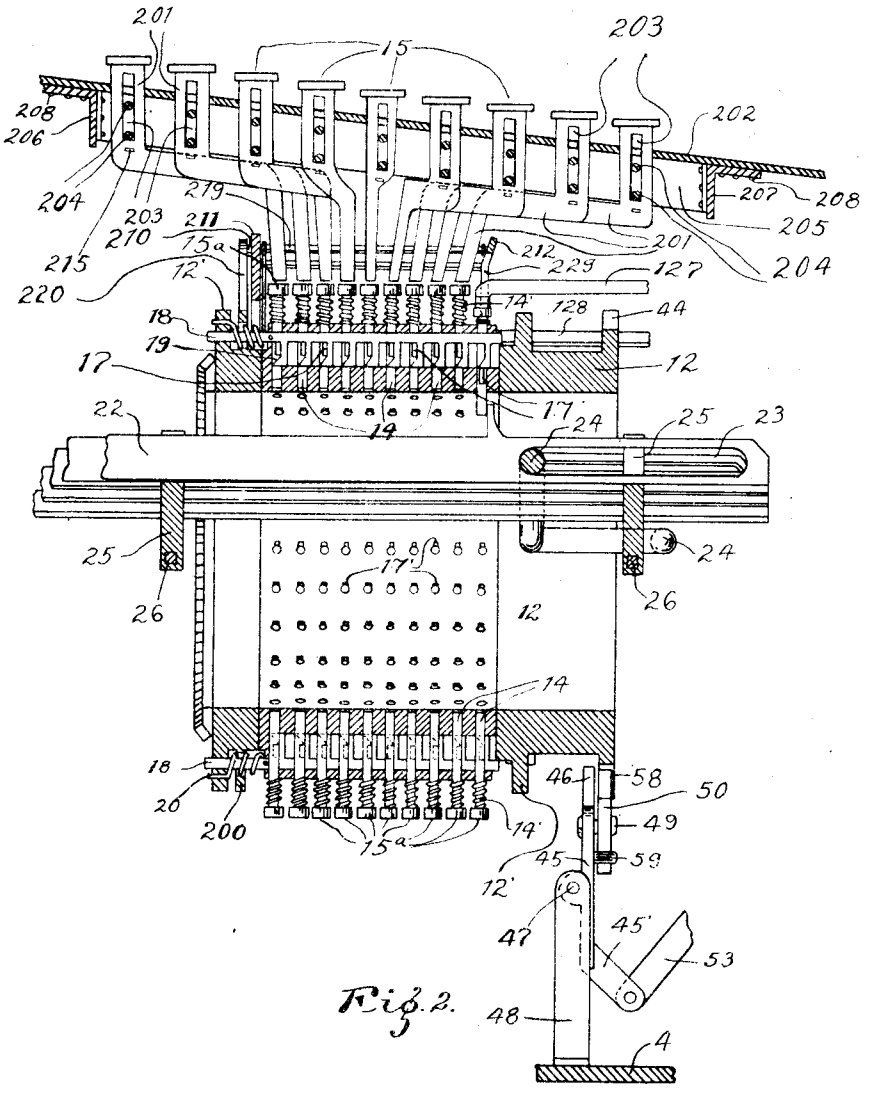


Fig. 2.

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ADDING MACHINE

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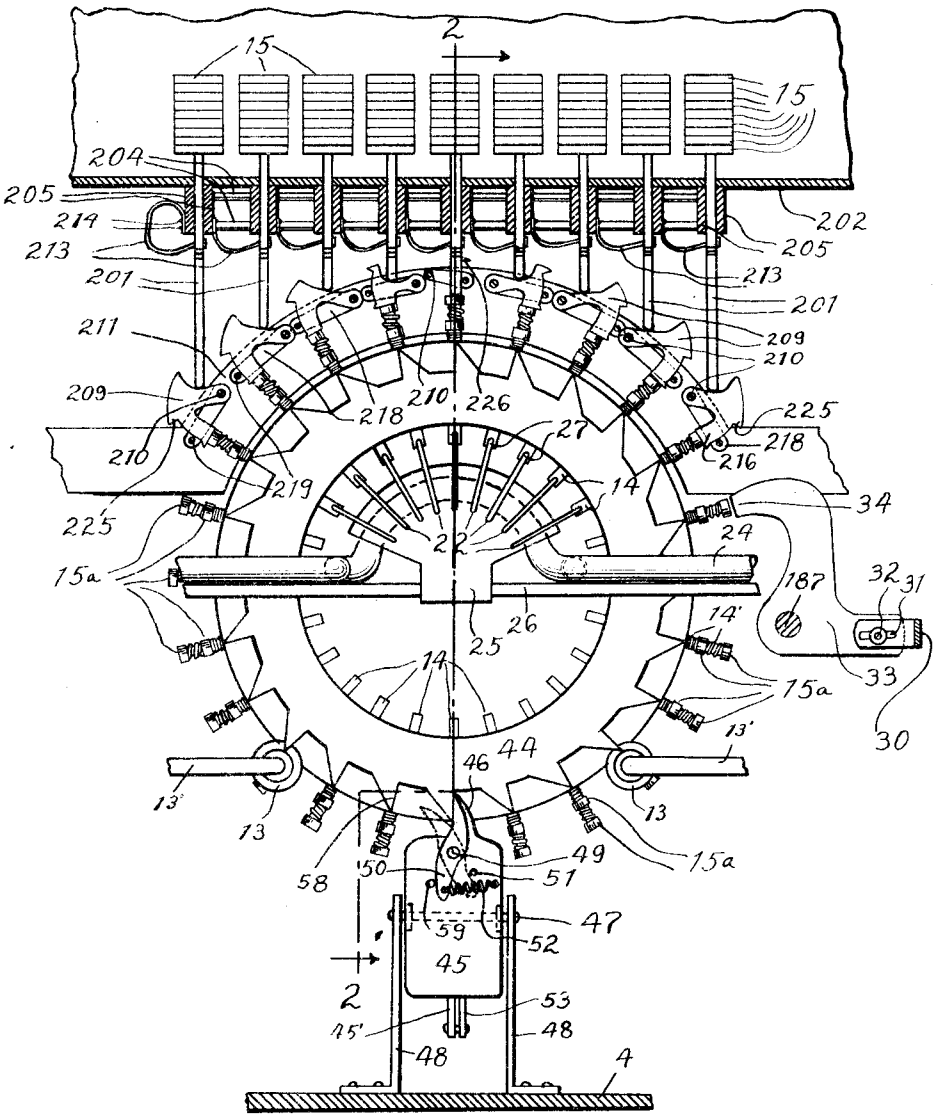


Fig. 3.

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March 24, 1925. 1,531,041

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ADDING MACHINE

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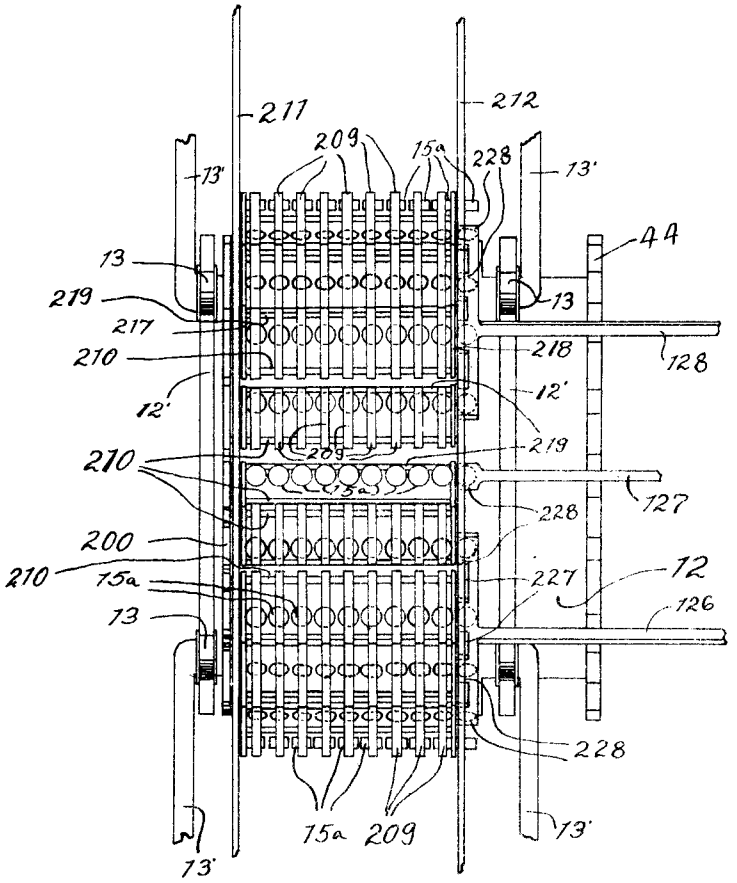


Fig. 4.

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March 24, 1925.

1,531,041

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ADDING MACHINE

Filed July 23, 1924

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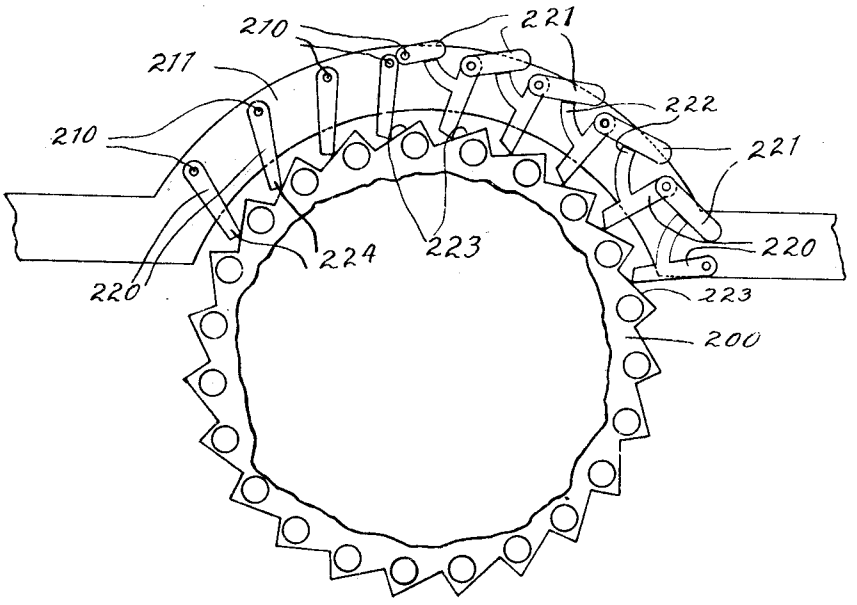


Fig. 5.

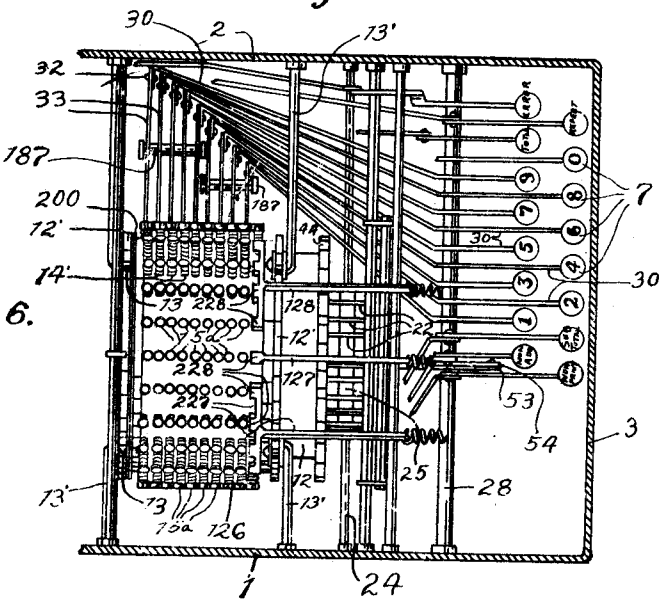


Fig. 6.

INVENTOR

Harold S. Stinson

Patented Mar. 24, 1925. 1,531,041

UNITED STATES PATENT OFFICE.

HAROLD S. STINSON, OF ST. LOUIS, MISSOURI.

ADDING MACHINE.

Application filed July 23, 1924. Serial No. 727,701.

To all whom it may concern:

Be it known that I, HAROLD S. STINSON, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Adding Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The invention relates to certain new and useful improvements in adding machines, and it consists substantially in such features of construction, arrangement, and combination of parts as will be hereinafter more particularly described.

The invention has reference more particularly to the class of adding machines such for instance as is shown and described in a patent issued to me, Patent No. 1,503,171, dated July 29, 1924, and the object of this invention is to increase the utility of the said invention without materially varying the principles of operation.

In the class of machines as illustrated in my former patent there are ten digit-keys numbered from "0" to "9" inclusive, which cooperate with one of a series of ten stops in a traveling carriage, there being any suitable number of series of stops depending on the calculating capacity of the machine. An escapement and motor device is provided to operate effectually to move the carriage step by step on the depression of a key, and by the successive operations of the keys any desired number may be set up or introduced into the machine, after which a handle located at the right-hand side of the machine is pulled forward to cause segmental racks to be moved until arrested by the set stops, which positions the printing-type in printing line, and also determines the extent of rotation of the accumulating wheels.

My present invention does not comprehend in its scope any improvement in these well-known devices which exist in practically all adding machines, but relates more particularly to the method of setting the stops.

The ten-key calculating machines on the market today are unquestionably more efficient for some classes of work than that type of machine having a plurality of series of keys, such for instance as the well-known type of machine one embodiment of which is illustrated and described in a patent issued to Wm. S. Burroughs, under date of September 12, 1893, serial No. 504,963.

However, the latter machine is far superior to the ten-key machine in other classes of work.

With this well-known fact in mind, I have constructed mechanism for combining the so-called ten-key calculating machine (by which a number is set up or introduced into the machine by the successive operation of the keys) with that type of machine employing a number of series of keys.

It will be apparent that the means for accomplishing this result may vary widely without departing from the spirit of my invention, or the scope of my claims.

In the drawings—

Fig. 1 is a plan view of a machine embodying a preferred form of my invention.

Fig. 2 is a detail vertical longitudinal section of the cylindrical revoluble stop-carriage and the key mechanism, taken on the line 2—2 of Figure 3, and looking in the direction of the arrows.

Fig. 3 is a detail end-elevation of the cylindrical stop-carriage, its escapement and connections, and the key mechanism, parts being broken away, and other parts being sectioned.

Fig. 4 is a detail plan-view of the cylindrical stop-carriage, showing the series of crank levers and parts which serve as intervening connections between the keys and the stops, parts being broken away, and others not shown in order not to be confusing.

Fig. 5 is a detail fragmentary end-view of devices for causing the numbered caps or keys to operate in cooperation with the stops.

Fig. 6 is a detail fragmentary plan-view of the ten-key mechanism and the stop mechanism, the casing being in section, and partially removed, to show the construction of above mechanisms.

Fig. 7 is a detail fragmentary side-elevation of keys 7.

The present stop mechanism.

As in the class of machines embodying the principles of operation set forth and shown in my former Letters-Patent referred to, so there is in the present instance a revoluble cylindrical stop-carriage marked 12. This cylindrical stop-carriage is mounted to re-

volve upon any suitable bearings, such as the rollers 13, Figs. 4 and 6, and it extends in the present case longitudinally of the machine near the front end thereof, said rollers having suitable supports 13′ which are secured to the frame of the machine.

Said rollers 13 engage circular rails or flanges 12′ located adjacent the front and rear ends of said cylindrical stop-carriage 12, Fig. 4.

In the present machine there are twenty-four rows, of ten stops each arranged longitudinally, side by side, around the circumference of the said cylindrical-carriage 12, but I do not limit myself to such number or arrangement of stops 14, as the number may be increased or diminished without departing from the spirit of my invention or the scope of my claims.

Any well-known or preferred means may be employed to hold the stops 14 in a depressed position, in opposition to their springs 14′, which encircle free stems of said stops, and bear against the inner faces of caps 15ª which are affixed to said stops 14 and the outer periphery of said cylindrical stop-carriage, to normally retain the stops at the limit of their outward movement, in a non-stop position.

In the present machine, I have provided each of said stops 14, with a laterally-projecting lug or ear 17, which may also be termed a spline or fixed key, inasmuch as it slides in a keyway 17′ extending laterally from each of the inner stop-bearings of said carriage 12, Fig. 2.

Said stop splines, studs, or ears on said stops 14 thus prevent turning of the latter in their bearings, and yet axial movement therein is permitted.

Each row of stops 14 is provided with a sliding latch-bar 18 which is mounted in suitable bearings in the rear annular rail or flange 12′ and star-wheel or ratchet-wheel 200 of said revolving stop-carriage 12, and in other parts of the latter further forward, Fig. 2.

Each of said latch-bars 18 has a series of cams or lateral arms carrying inclined faces 19, which, upon the depression of a stop 14 (or a series of said stops) are engaged by the corresponding inwardly-moving spline or stud 17 of the depressed stop, and said latch bar is caused to move horizontally towards the front of the machine against the stress of the latch bar spring 20, out of the path of said spline or stud 17, until the latter has passed said cam or inclined face 19 of said latch-bar 18, whereupon the latter will be quickly brought back to its normal position by the power of its said spring 20, and the depressed stop will be thereby held in a depressed position, as shown at the upper right-hand of Fig. 2.

As a result of this construction and operation, the depression of a second stop in the same row or series of stops, will move the said latch-bar 18 thereof to an unlatching-position, and the first-locked stop 14 will be released, and will return to normal position by the power of its spring 14′, and the second stop will be locked in position, and so on.

Said latch-bar springs 20 are, in the present case, atttached to their respective latch-bars 18 at their forward ends, and connected to the rear annular track or carriage-flange 12′ at their rear ends; but of course any other arrangement of latch-bar springs will be acceptable, provided such springs accomplish the movement of said latch-bars in substantially the same way that is herein shown and described.

The present numbering means.

The numbered stop caps 15, which were affixed or directly connected to the stops 14 in my former patent, are indirectly connected to said stops in this embodiment of the invention, their movement, however, is controlled by the stops in the same manner as in my former patent as will hereinafter become evident.

The purpose of this construction is to bring the said numbered caps on a plane with one another and other objects which will hereinafter be apparent.

It should be understood, of course, that the mechanism required for this purpose in the machine illustrated would not necessarily be needed in all embodiments of the invention. It being required only in cases where the stops are not on a plane with one another, that is on the same transverse line.

Any suitable or preferred means may be employed to accomplish this feature.

The numbering means in this embodiment consists in detail of a number of series of numbered caps 15, hereinafter termed keys, (nine keys to each series) which are affixed to key-stems 201. These key-stems extend through slots in the top-plate 202 of the machine and arranged side by side, each key-stem 201 having a slot 203 and cross-rods 204 beneath the plate 202 pass through the said slots 203 of the said key-stems, which lie on the same transverse line, thus guiding said key-stems backward and forward movement. The said cross-rods are journaled in suitable brackets or bars 205, there being one of said bars on either side of each series of key stems 201, and said bars serve to guide the lateral movement of the key-stems. The bars 205 are secured to suitable brackets 206 and 207 which are affixed to the top of the machine by means of rivets 208.

The top center series of key-stems 201 are arranged to operate the stops 14 which are in operative alignment with them, Fig. 2.

All other series of the said key-stems do

not act directly on the stops 14 due to the fact that they (the key-stems) form an angle with said stops. Beneath each key-stem is a crank-lever 209 which is loosely mounted on a shaft 210, there being one of said shafts for each series of crank levers 209. The said shafts are pivotally mounted in arcuate or curved members 211 and 212 located near either end of said carriage 12. The said arcuate or curved members have extensions to the side frames of the machine to which they are secured.

Suitable springs 213 are provided which have a tendency to hold the key-stems in a depressed position, but are prevented from depressing said key-stems by the springs 14' which encircle the stops 14 and which have a greater tension than the springs 213. One end of the springs 213 is in this embodiment secured to the bars 205 by means of rivets 214 and the other end of same extends through rectangular notches 215 in the key-stems and are bent over to prevent slipping out of said notches. The crank-levers 209 are provided with fingers 216 which are adapted to cooperate with the stops 14.

The numbered caps being thus arranged will not only serve the purpose of indicating the value of each respective stop, but will also enable the operator to use the numbered caps as keys to set up numbers in the machine independently of any other operating devices. Thus, for instance, in introducing a number into the machine having a number of zeros, like the number 9,000,000. The key-board above would be more convenient to use. The operator would merely depress the nine key in the millions column. This will save him the trouble of striking the nine once and the zero key six times, which operations are necessary in ten-key machines. This feature can also be used in correcting errors made in setting up a number into the machine by the ten-key system. For instance, if the number 987 was intended to be introduced or set up in the machine and the operator accidentally or erroneously sets up 887. The error may be corrected by depressing the nine key in the hundreds column, which will unlatch the "8" key and allow it to resume its normal position and the nine key will be held in a depressed position. This arrangement of the numbered caps or keys will serve many other purposes which will be apparent to those skilled in the art.

When the ten-key mechanism is used in introducing numbers into the machine, mechanism is provided to cause the numbered caps or keys to operate in cooperation with the stops 14 in order to visibly indicate the value of the number set up in the machine.

The mechanism for accomplishing this purpose could be constructed in various ways and I, therefore, do not restrict myself to the embodiment herein illustrated which consists of a series of two mating levers 217 and 218 rigidly secured to either end of each shaft 210 between the members 211 and 212. Figs. 3 and 4. The outer ends of the levers 217 and 218 are connected together by means of longitudinal horizontal rods 219 which are rigidly secured to said levers. Mounted on the rearward projecting end of each shaft 210 is a pawl 220. The pawls 220 to the left of the top center row of keys 15 are rigidly secured to their respective shafts. However, those to the right are loosely mounted on their respective shaft. Rigidly secured to the rear end of each shaft 210 to the right of the top center row of keys are levers 221. The pawls 220 to the right are provided with fingers 222 which are adapted to operate the levers 221.

Rigidly secured to the stop-carriage 12, near the rear end of same is a star-wheel or ratchet-wheel 200. The pawls 220 are adapted to engage with inclined faces 223 of said star-wheel or ratchet-wheel.

When a key of the ten-key system is depressed, as will hereinafter be apparent, a stop 14 corresponding to the value of the depressed key will be set. Upon the restoration of the depressed key, an escapement mechanism, hereinafter to be described, will actuate to permit the stop-carriage 12 to revolve one step from right to left which will cause the row of stops 14 in which said stop was set also to move one step to the left. Simultaneously the ends 224 of the pawls 220 will ride the said inclined faces 223 of the ratchet-wheel 200, which, being rigidly secured to the stop-carriage, will also move one step to the left, and cause the shafts 210 to vibrate in their journals in the members 211 and 212, Fig. 5. The rods 219, being rigidly connected to the shafts 210 as hereinbefore explained by the mating levers 217 and 218, will be caused to vibrate therewith, and in so doing will contact the shoulders 225 of the crank levers 209 and projections 226 of the center top row of key-stems 201, and the said crank levers and key-stems will be held thereby in an upward position during the movement of the stop-carriage. The path of the stops 14, obviously, will therefore be unobstructed during the movement of said stop-carriage.

When, however, the carriage has reached the end of its movement for that step, the pawls 220 will have come to the end of the inclined faces 223 of said star-wheel 200 and their movement will be reversed from an upward to a downward direction under the action of the springs 213. The downward movement of the keys 15 will then be restricted only by the springs 14' as herein-

before explained. The row of stops 14 in which the first stop was set will (after the stop-carriage moves one step to the left as just described) now be in operative alignment with the first row, or numerical order of the keys 15 of the full-keyboard, and since the downward movement of said keys are restricted only by the springs 14′ the key of the first numerical order corresponding to, and bearing a number representing the value of, the depressed stop will drop, or follow such stop and visibly indicate to the operator the value of the set stop after the key of the ten-key system which set it resumes normal position.

Upon the depression of another key of the ten-key system a stop corresponding in value to the key depressed will be set in the row of stops next adjacent to the right of the row in which the first stop was set. Upon restoration of the depressed key, the said escapement mechanism will permit the stop-carriage to move another step from right to left. Simultaneous with the movement of the stop-carriage after the restoration of the depressed key as explained above, the ends 224 of the pawls 220 will ride the inclined faces 223 of the ratchet-wheel 200 and they will be thereby raised by the movement of said ratchet-wheel with said carriage and cause the shafts 210 to which they are connected to vibrate in their journals in the members 211 and 212. The rods 219, being connected, as previously explained, to the shafts 210 will be caused to vibrate therewith and in so doing will contact the shoulders 225 of the crank levers 209 and projections 226 of the center top row of key-stems 201, and any of the said crank levers or key-stems which may have been set will be raised thereby to resume their normal upward position against the action of their springs 213. Obviously the keys 15 being thus held in their normal upward position during the movement of the stop-carriage will offer no interference with the movement of same. Upon the completion of the movement of the stop-carriage for that step, the pawls 220 will have again come to the end of the inclined faces 223 of said star-wheel 200 and their movement will again be reversed. The downward movement of the keys 15 will again only be restricted by the springs 14′. The two rows of stops in which the first and second numbers were introduced will now (after the stop-carriage moves another step to the left as just described above) be in operative alignment with the second and first rows, or series of keys of the full-keyboard respectfully, and since the downward movement of the said keys are restricted only by the springs 14′ the keys of the first and second numerical orders corresponding to, and bearing the numbers representing the value of, the depressed stops will drop, or follow such set stops and visibly indicate to the operator the value of the stops he has set. Thus, the set keys 15 will indicate to the operator the value of the stop or stops he has set. This operation of raising the depressed keys 15 upon a movement of the stop carriage after the restoration of a depressed key of the ten-key system, and after the completion of the movement of the carriage for that step, the automatic depression of keys 15 corresponding to the stops 14 which have been set in said carriage, is repeated at each operation of a key until the whole amount is introduced into the machine.

After an adding operation, it will be apparent that the depressed stops in returning to their normal position will automatically return the keys 15 which have been allowed to set therewith.

The means for recording and adding numbers set up in the machine forms no part of my present invention and is therefore not illustrated in full in the drawings. I have illustrated, however, the stop-links 22 which are connected to actuate such devices which may be of any suitable character. There is a separate stop-link 22 for each numerical order.

All of the said stop-links, as in my former patent extend through the bore or interior of the said rotating cylindrical stop-carriage 12 to a point forward of the front end of said carriage, where said links are each provided with a slot 23. In the present case, all of said stop-links are arranged in an arcuate or curved relation, in which their front portions are held or guided by a correspondingly-curved guide-rod or bar 24, which is suitably supported from the frame of the machine.

Any suitable slotted guiding-members 25 may be employed to prevent lateral movement of the said stop-links 22, Figs. 2 and 3. Said guiding members being supported in position by cross-bars or rods 26, which are shown rectangular in cross section to prevent rotation or rocking of said supports thereon.

Each stop-link 22 is provided on its upper edge with a vertical stop-lug or pin 27 to engage the stops 14 of its row of stops.

One of the present methods of projecting the stops into the path of the stop-lugs or pins 27 comprises a plurality of keys 7 that are numbered from "0" to "9" inclusive, and arranged in two banks or rows, Fig. 1 and other mechanism which will now be described.

Said keys are carried by key-levers 30, which are fulcrumed on a key-lever shaft 28, which has its ends mounted in bearings carried by the opposite side-members 1 and 2 of the frame or casing, Fig. 6.

Each of the keys 7 is provided with any suitable spring to restore them to normal elevated position after a depression thereof. Each of the said key-levers 30, with the exception of the "0" key-lever, is in the present illustration, bent at an angle, toward the right hand side of the machine, Fig. 6, at a point a little beyond the fulcrum shaft 28, so that the rear ends of all of said key-levers occupy a position at the right-hand side of the said cylindrical stop-carriage 12 and as closely as possible to the adjacent right-hand side-member 2 of the casing. This angular form of said key-levers is made use of in the present case in order that said key-levers and their stop-depressing fingers, hereinafter presently described, be located at the side of said cylindrical stop-carriage, and to avoid locating such mechanism on top of said carriage.

The inner angular portion of each key-lever 30 has its rear end bent to a position at right-angles to the adjacent side member 2 of the machine casing, Fig. 6, so that said bent end will project inwardly toward said cylindrical stop-carriage 12, and a longitudinal slot 31, through which projects a pivot-pin, bolt or rivet 32, by means of which a stop depressing finger 33 is pivotally-connected to said slotted bent portion at the inner end of each of said key levers, Fig. 3.

Said stop-depressing fingers 33 are somewhat of a bell-crank or L-shape in side elevation and they are pivotally mounted on short shafts 187, which extend longitudinally of the machine, and are mounted on suitable supports shown at the right-hand of the said cylindrical stop-carriage 12.

The free arms of said stop-depressing fingers 33 have an inwardly projecting nose or hammer 34 at its free end, which is brought into contact with one of the said stop-pin caps 15^a, and depresses same, upon the actuation of its key-lever 30, the value of the stop 14 depending, of course, upon the key depressed.

As the operator sets up an item on the key-board, by the successive operation of the keys, the said cylindrical stop-carriage 12 is revolved step by step in a direction the reverse of clockwise, or from right to left, one step for each numerical order in the item being set up, as each number-key is depressed and restored.

The means for revolving the said carriage forms no part of my present invention and therefore is not illustrated.

The present escapement-mechanism comprises a suitable escapement-wheel 44, Figs. 2 and 3, having the well-known peripheral teeth with one radial face and one inclined face, and rigidly secured to the front end of the said cylindrical stop-carriage 12, to rotate with the latter.

Engaging the teeth of said escapement-wheel 44 is a control-plate 45 having a tooth 46 at its upper end, and mounted on a pivot-shaft or pivots 47, which supporting-brackets 48 carry, the latter rising from the base-plate 4 of the machine, at a point beneath the front end of said cylindrical stop-carriage 12.

Pivoted at 49 to the front face of said control-plate 45 near the upper end of the latter, and vibrating therewith, is a dog 50, the lower portion of which is normally held against a pin or stop-stud 51 projecting from the front face of said control-plate, by a spring 52, the inner end of which is secured to the said dog at a point below its pivot 49, and the outer end of which spring is fixed to said control-plate.

At the lower end of the control-plate 45, and extending at an angle therefrom, forwardly and downwardly, Figs. 2 and 3, is a perforated ear or arm 45′, to which is pivoted the lower end of an escapement-pitman 53, which extends upwardly and forwardly and has its upper end pivoted to an arm 54 rigidly mounted upon the key-lever shaft 28, Fig. 7, and held in normal position by a suitable spring.

Said key-lever shaft 28 has a spline or key 56, which extends longitudinally thereof along all of the portion which is occupied by said key-levers 30, and said spline passes through a slot 57 in each of said key-levers 30, Fig. 7, so that upon the depression of a key said key-lever shaft 28 will be rocked a limited distance in its bearings, and the escapement-pitman 53 will rock said control-plate 45, and force its tooth 46 toward the front, into engagement with the adjacent lowermost tooth 58 of said escapement wheel 44, and at the same time release said dog 50 from that tooth, whereupon said dog-spring 52 will throw said dog into position indicated by dotted lines in Fig. 3 with its lower portion in contact with said stop-pin 51.

Upon restoration of the depressed key 7, said control-plate 45 will be moved in a reverse direction, back to its original position, with said tooth 46 out of engagement with the previously-stopped tooth 58 of said escapement wheel 44, in which latter position it is shown in Fig. 3; and simultaneously said dog 50 will be thrown into the path of the next adjacent tooth of said escapement-wheel, and will stop it, and permit the latter to move one step (or one tooth) which is the distance required to bring the lower portion of said dog into contact with its back-step pin or lug 59, that projects from the front face of said control-plate, and this operation is repeated with each depression of a key.

Upon completion of an adding operation it is necessary that the set-up number be eliminated from the cylindrical stop-car-

riage 12, in order to allow another number to be set up in the machine.

The devices which are provided for accomplishing this feature are identical to those illustrated and described in my former patent hereinbefore referred to, and since it does not form a part of my present invention, it will not be explained. I desire, however, to show that a slight modification of the configuration of the T-shaped heads of the depressing levers 126 and 128 has been made for the purpose of enabling them to operate free of the member 212. Like in my former patent referred to the means provided for this purpose consists of three depressing-levers 126, 127 and 128, respectively, which are provided at their rear ends with T-shaped heads that engage the caps 15^a of the nine adjacent zero-stops 14 whose caps are exposed at the top side and front end of said cylindrical-carriage 12. Two of said zero-stop depressing-levers 126 and 128, have cap-engaging heads at their rear ends which are curved to correspond substantially to the curvature of the periphery of said cylindrical-carriage 12, and these curved heads are set to move up and down at an angle in order that each of said heads may simultaneously engage and depress four of the adjacent zero-stop caps 15^a of the series that need to be depressed.

The top, or centrally-located lever 127 has a short T-head inasmuch as it engages but a single zero-stop cap 15^a, and that is located at the extreme top of the series, between the two side-series of said caps, which are covered and depressed by the adjacent longer T-heads of the said levers 126 and 128.

The said T-heads of the levers 126 and 128 are in this embodiment of the invention each provided with three rectangular notches 227 on the rear side thereof, Figures 4 and 6. The portions 228 of said T-heads are adapted to occupy such position as to enable them to engage the four adjacent zero-caps 15^a and also to pass through suitable slots 299 in said member 212. Of course, it is evident that any other modification of this arrangement which will prevent the member 212 from interfering with the operation of the levers 126 and 128 will be satisfactory.

The said three zero-stop depressing levers are arranged to simultaneously depress all of the said nine adjacent zero-stops 14 whose caps 15^a are located at the top of said cylindrical-carriage 12, which will release all other depressed stops, in the same manner as illustrated and described in my hereinbefore referred to patent. This device, not forming a part of my present invention, has not been explained in detail.

The principle and mode of operation of my invention will, I think, be entirely clear to those skilled in the art from the above description of the same, in the one preferred embodiment of the machine herein illustrated, but I would have it understood that my invention is not limited to the specific construction and arrangement shown, the various features being susceptible of use in adding-machines and other calculating-machines of different types.

I claim and desire to secure by Letters-Patent:—

1. In a calculating-machine, the combination of a plurality of operating keys, stops operated by the successive operations of said keys to represent numbers, and a plurality of series of keys capable of operating said stops, substantially as described and for the purposes set forth.

2. In a calculating-machine, the combination of a number of series of stops which may be set to represent numbers, with two separate key-mechanisms for operating said stops, substantially as described and for the purposes set forth.

3. In a calculating-machine, the combination of a plurality of operating keys, a number of series of stops operated thereby, and keys whereby the stops in each series may be independently restored to their normal positions and the desired stops set.

4. In a calculating-machine, the combination of a plurality of operating keys, stops operated thereby, and a separate stop operating means connected to each stop, substantially as described.

5. In a calculating-machine, the combination of the stop-links 22, a series of stops adapted to be interposed into the path of each link and limit the movement of the same, manual means for setting said stops to represent numbers, and a separate means capable of operating said stops.

6. In a calculating-machine, the combination of a plurality of operating keys the successive operations of which will cause a number to be set up in the machine, and a number of series of operating keys which may be set to correct or change the number set up.

7. In a calculating-machine, the combination of ten digit-keys numbered from "0" to "9" inclusive, a number of series of stops arranged in rows in a traveling carriage and adapted to be operated thereby, intermediate connections between said keys and said carriage to cause the latter to move step by step upon the depression of a key, and a number of series of keys operatively connected to the stops of said carriage.

8. In a calculating-machine, the combination of a key plate, a number of series of vertically movable keys extending through said plate and arranged side by side, each key having a slot and cross-rods extending beneath the plate and passing through the

slots of the said keys which lie in the same transverse line, stops operable thereby, and ten digit-keys numbered from "0" to "9" inclusive operatively related to said stops.

9. In a calculating-machine, the combination of a plurality of operating keys numbered from "0" to "9" inclusive, a number of series of movable stops arranged in numerical orders and adapted to be set thereby to represent numbers, and a plurality of series of keys operatively connected to said stops.

10. In a calculating-machine, the combination of a suitable key-board in which are arranged or set ten digit-keys numbered from "0" to "9" inclusive, a suitable stop mechanism having a number of series of stops adapted to be operated from said key-board, and a second key-board in which are arranged or set a number of series of keys having separate operative connections to said stops.

11. In a calculating-machine, the combination of a suitable key-board in which are arranged or set a number of series of keys operatively connected to a suitable stop mechanism, a second key-board in which are arranged or set ten digit-keys numbered from "0" to "9" inclusive and having separate operative connections to said stop mechanism, and means for causing the first mentioned keys to operate to visibly indicate the stops set by the second mentioned keys.

12. In a calculating-machine, the combination of a suitable key-board in which are arranged or set a number of series of keys, a movable stop-carriage, rows of stops in said carriage, a second key-board in which are arranged or set ten digit-keys numbered from "0" to "9" inclusive, and means for causing the first mentioned keys to operate to visibly indicate the stops set by the second mentioned keys, substantially as described.

13. In a calculating-machine, the combination of a suitable key-board in which are arranged or set a number of series of keys, a revoluble cylindrical stop-carriage, rows of stops in said carriage, a second key-board in which are arranged or set ten digit-keys numbered from "0" to "9" inclusive, and means for causing the first mentioned keys to operate to visibly indicate the value of the stops set by the second mentioned keys.

14. In a calculating-machine, the combination of a plurality of operating keys, a revoluble group of stops adapted to be operated thereby, and a number of series of keys operatively connected to said stops to enable the operator to change the setting of the stops operated by the first mentioned operating keys.

15. In a calculating-machine, a key-board comprising a plurality of keys, a carriage controlled by said keys, means holding said carriage, pins in said carriage, latch devices in said carriage holding said pins when they are moved by said keys, and a number of series of keys operatively connected to said pins, substantially as described.

16. In a calculating-machine, the combination of a suitable stop mechanism, suitable stops in said mechanism, latch devices for holding said stops when they are moved, a plurality of keys for setting said stops to represent numbers, and a number of series of keys operatively connected to said stops.

17. In a calculating machine, the combination of a plurality of operating keys, stops operated thereby, and means adapted to automatically operate after the setting of a stop to visibly indicate the value of the set stop.

18. In a calculating machine, the combination of a suitable stop carriage, stops in said carriage, a plurality of operating keys for setting said stops, and means adapted to automatically operate after the setting of a stop to visibly indicate the value of the set stop.

19. In a calculating-machine, the combination with a plurality of keys, of a number of series of stops arranged in rows, means for successively placing each series under the control of said keys, and separate keys whereby the stops in each series may be independently restored to their normal positions and the desired stops set.

20. In a calculating-machine, a suitable stop mechanism, stops in said mechanism, a plurality of keys for setting said stops, crank-levers 209 adapted to ride on said stops, key-stems 201 adapted to ride on said crank-levers, and number bearing caps connected to said key-stems, substantially as described.

21. In a calculating-machine, a suitable stop mechanism having a number of rows of stops, the number of rows of said stops being greater than the calculating capacity of the machine, a plurality of keys for setting said stops, and a number of series of keys operatively connected to said stops, the number of series of said keys being equal to the calculating capacity of the machine.

22. In a calculating-machine, a suitable stop mechanism having a number of rows of stops, the number of rows of said stops being greater than the calculating capacity of the machine, a plurality of keys for setting said stops, a number of series of keys operatively connected to said stops, the number of series of said keys being equal to the calculating capacity of the machine, and means for causing the latter keys to operate to visibly indicate the value of the stops operated by the former keys, substantially as described.

23. In a calculating-machine, a key-board comprising a plurality of keys, a carriage controlled by said keys, rows of stops in said carriage, the number of rows of said stops being greater than the calculating capacity of the machine, latch devices in said carriage holding said stops when they are moved by said keys, and a number of series of keys operatively connected to said stops, the number of series of said keys being greater than the calculating capacity of the machine.

24. In a calculating-machine, a suitable stop mechanism, stops in said mechanism, a plurality of keys for setting said stops, crank-levers 209 adapted to ride on said stops, key-stems 201 adapted to ride said crank-levers, number bearing caps 15 connected to said key-stems, and suitable springs 213 having a tendency to urge said crank-levers, key-stems, and number bearing caps in a depressed position.

25. In a calculating-machine, a suitable stop carriage, stops in said carriage, a plurality of keys for setting said stops, intermediate connections between said keys and said carriage to cause the latter to move step by step upon the depression of any of said keys, crank-levers 209 adapted to ride on said stops, key-stems 201 adapted to ride said crank-levers, number bearing caps 15 connected to said key-stems, suitable springs 213 having a tendency to urge said crank-levers, key-stems, and number bearing caps in a depressed position, a ratchet-wheel 200 connected to said stop carriage, and intermediate connections between said ratchet-wheel and said crank-levers to cause the latter, should any of them be in a depressed position, to be raised when the former moves with said stop-carriage upon the depression of any of said keys and to cause the said crank-levers to be released and to again depress themselves upon the completion of the movement of the said stop-carriage, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

HAROLD S. STINSON.

Witnesses:
CLAUDE M. MCCORKLE,
HARRY KRAUS.