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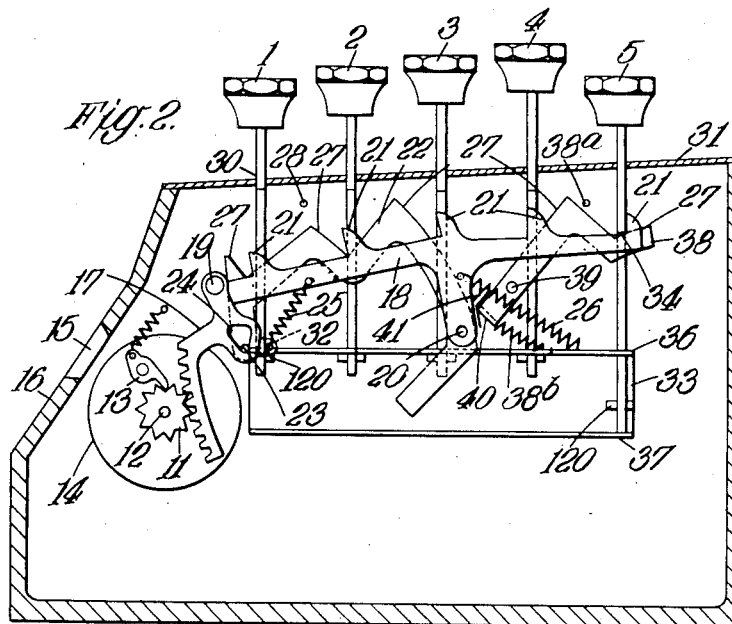
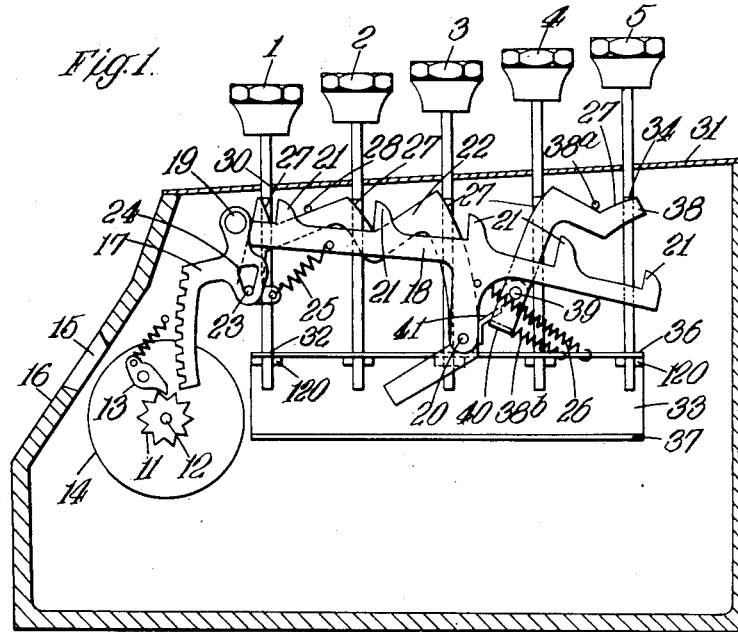
G. B. PETTER

1,983,945

CALCULATING OR ADDING MACHINE

Filed June 26, 1931

3 Sheets-Sheet 1



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Dec. 11, 1934.

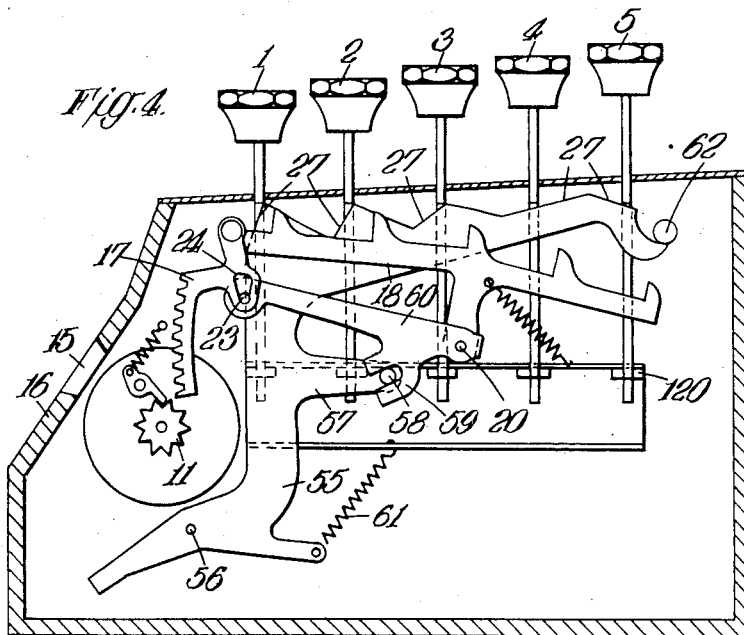
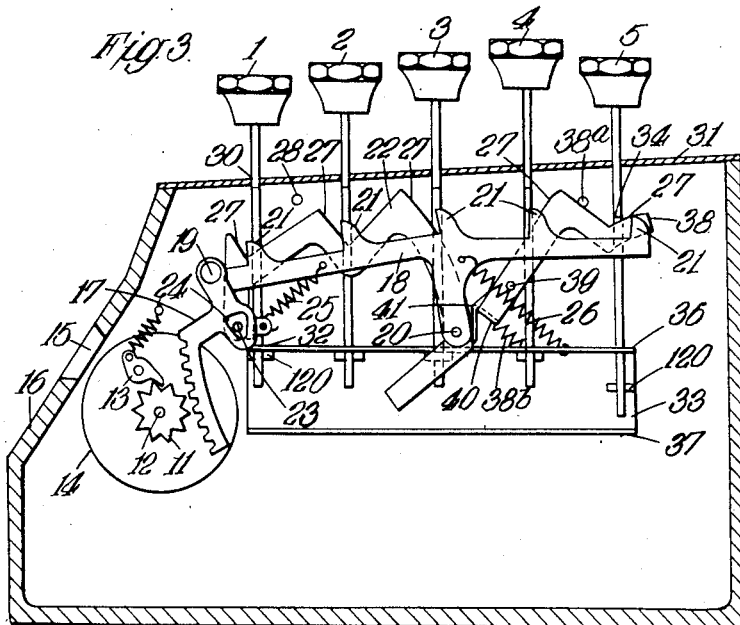
G. B. PETTER

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CALCULATING OR ADDING MACHINE

Filed June 26, 1931

3 Sheets-Sheet 2



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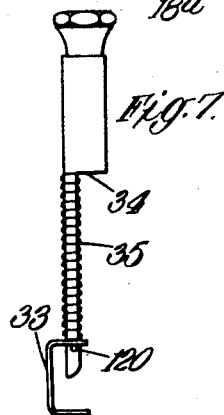
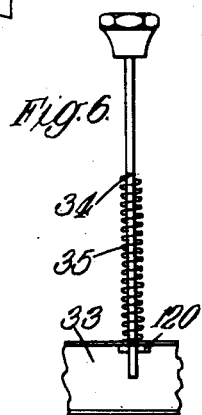
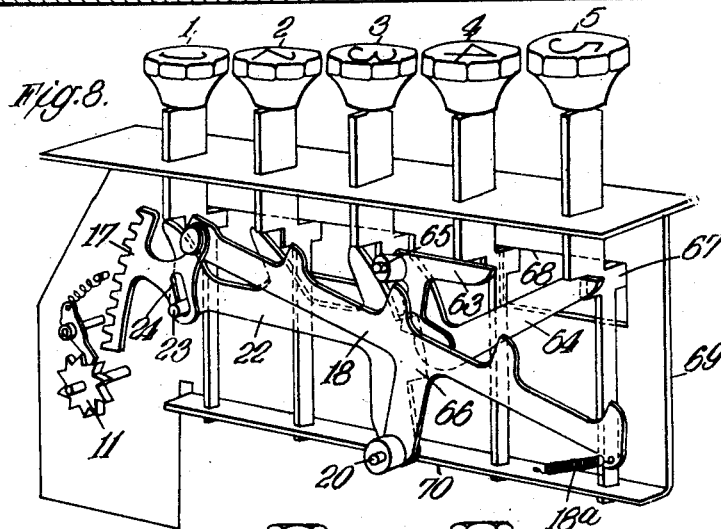
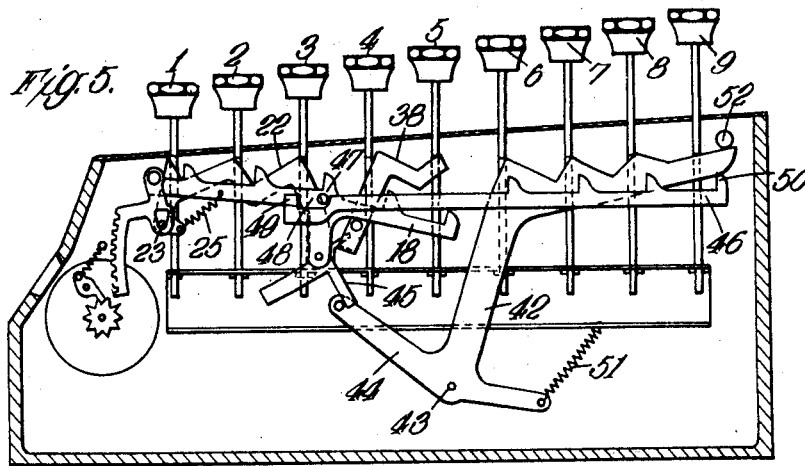
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1,983,945

CALCULATING OR ADDING MACHINE

Filed June 26, 1931

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,983,945

CALCULATING OR ADDING MACHINE

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a British Company

Application June 26, 1931, Serial No. 547,161
In Great Britain August 1, 1930

21 Claims. (Cl. 235—82)

This invention relates to calculating or adding machines of the multiple bank type having a series of ordinal keys in each bank and in which a gear segment rotates a pinion associated with a numeral wheel upon depression of one of the keys to an extent depending upon the particular key depressed.

One of the objects of the present invention is to provide an improved and compact machine of the above type in which the actuating mechanism is so constructed and arranged that it may be accommodated in a casing which extends at the back only slightly beyond the rear keys. A further object is to provide an improved mechanism for causing engagement of the gear segment with the pinion in one direction of movement thereof and for permitting an inoperative movement of the segment, relatively to the pinion on the return of said segment to the initial position. A further object is to provide a machine having an improved arrangement of actuating levers and in which the shock of the arrest of the keys is not transmitted to the levers or any part of the actuating mechanism.

The invention consists in the combinations claimed in the several claims appended hereto.

The mechanism according to the invention may be employed in connection with a partial keyboard machine or in connection with a machine having a full range of keys.

In order that the said invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to the accompanying drawings which illustrate several forms of the invention as applied by way of example to calculating or adding machine operating in the decimal system of notation and in which:—

Figure 1 illustrates in side elevation one form of actuating mechanism according to the invention and applied to a partial keyboard machine;

Figure 2 is a view similar to Figure 1 but showing the position of the mechanism when the key 5 is depressed;

Figure 3 is a view similar to Figure 2 showing the position of the mechanism when the key 5 has partly returned to its initial position;

Figure 4 is a view similar to Figure 1 showing a modified arrangement;

Figure 5 is a view similar to Figure 1 but illustrating the invention as applied to a full keyboard machine;

Figures 6 and 7 illustrate in detail in side and front elevations respectively the keys employed in machines according to the Figures 1 to 5, and

Figure 8 is a perspective view of a modified form of the invention.

In the application of the invention to partial keyboard machines five keys may be employed numbered 1, 2, 3, 4 and 5. When for example it is desired to add the number 6, 7, 8 or 9 it is necessary to depress two keys in succession. For example when it is desired to add the numeral "9" the "4" and "5" keys are successively depressed. For adding the numeral "8" the "4" key is depressed twice and so on.

Referring now to Figures 1, 2 and 3 of the drawings which show the invention as applied to a partial keyboard machine, five keys are provided numbered 1, 2, 3, 4 and 5. Reference numeral 11 is a pinion freely mounted upon a transverse spindle 12. The pinion has ten teeth and is associated with a ratchet pawl 13 which is arranged so as to permit rotation in a clockwise direction and to prevent rotation in the reverse direction. A numeral wheel 14 rotates with the pinion and carries around its periphery the figures, 0 to 9 one of which is at any time visible through a window 15 provided in the casing 16 enclosing the machine. The pinion is actuated by means of a gear segment 17 which engages and drives the pinion forward on the downward stroke of any one of the keys and is adapted to disengage the pinion upon the upward stroke and to lie in its inoperative position completely out of engagement with the pinion teeth, as shown in Figure 1. To effect this purpose the gear segment 17 is pivotally mounted at 19 upon a segment lever 18, the pivot 19 being located at a convenient distance behind the pitch circle of the gear segment 17. The segment lever in turn is pivoted upon a spindle 20 mounted in the frame of the machine. The segment lever is pivoted towards the middle of its length and extends along the bank of keys and is provided upon its upper surface with stops 21 corresponding in number with the number of keys for the purpose hereinafter stated. The keys 1, 2 and 3 co-operate with an actuating lever 22 which is pivotally mounted on the same axis or spindle as the segment lever 18. The actuating lever 22 has at its forward end a pin 23 which projects into a slot 24 formed in an extension of the gear segment 17. The slot 24 is of a substantially triangular shape and the pin 23 is adapted to lie in the apex of the slot on the downward stroke of the gear segment 17 whereby the gear segment 17 is moved into engagement with the pinion 11. Co-operating with the keys 4 and 5 is an auxiliary actuating lever 38 pivoted at 39. The auxiliary lever 38

engages the lever 22 by means of an arm or extension 40 co-acting with an arm 41 on the lever 22. The actuating lever 22 and the auxiliary actuating lever 38 extend beneath the keys and are serrated upon their upper edges the inclined surface 27 of the serrations being engaged by shoulders 34 on the keys upon the downward stroke thereof. The serrations are formed so that the edges are suitably inclined whereby the proper extent of movement of the actuating levers is afforded depending upon the particular key depressed. A stop 28 may be provided for limiting the upward movement of the actuating lever 22 or alternatively the lever may come to rest in contact with the shoulders of the keys. A similar stop 38^a may be provided for limiting the movement of the auxiliary actuating lever 38. The segment lever 18 is maintained in the position shown in Figure 1 by means of a spring 26. A spring 25 is provided attached at one end to the actuating lever 22 tending to draw the pin 23 up the slot 24. The other end of the spring 25 may be attached to a fixed point or to the segment lever as shown in the Figure 1. When the actuating lever is in the position shown or while during motion it is in contact with one of the keys the spring 26 is effective to overcome the tension of the spring 25 and to hold the pin 23 at the bottom of the slot 24. A further spring 38^b is provided which maintains the auxiliary actuating lever 38 in the position shown in Figure 1. On the depression of one of the keys 1, 2 or 3 the actuating lever 22 the gear segment 17 and the segment lever 18 move as one piece and the gear segment 17 enters into positive engagement with the pinion 11 moving it forward by an amount determined by the particular key depressed. The auxiliary actuating lever 38 remains stationary when the 1, 2, and 3 keys are depressed but when either the 4 or 5 key is depressed the auxiliary actuating lever is turned about its pivot 39 causing in turn angular displacement of the lever 22 as shown in Figure 2.

The keys are accommodated in upper slots 30 in the cover 31 of the machine and in lower slots 32 in a flanged or channel member 33 secured to a side wall or dividing partition separating the adjacent banks of keys. The keys are reduced in width at their lower ends as shown in Figures 6 and 7 so as to provide at their upper ends the shoulders 34 which engage with the serrated edges 27 of the levers 22 and 38. The keys are surrounded at their reduced parts by springs 35 which abut against the shoulders 34 and against the upper flange 36 of the channel member for the purpose of returning the keys to their initial positions, pins 120 limiting the upward movement of the keys. The strokes of the keys are preferably of the same length and the extent of travel is defined by the engagement of the lower ends of the keys with the lower flange 37 of the channel member 33. As aforesaid the shape of the serrations 27 of the actuating levers is such as to permit the proper extent of angular movement thereof according to the particular key depressed. The stops 21 on the upper edge of the segment lever 18 come into engagement respectively with the shoulders of the keys at the same time as the latter are arrested due to their engagement with the lower flange of the channel whereby the movement of the segment 17 is also arrested. So long as a key is held at the bottom of its travel as shown in Figure 2 the mechanism is locked so that the segment cannot come out of engagement with the pinion, but as soon as the

finger of the operator is removed the key returns to its initial position under the influence of its spring 35. The gear segment and segment lever are now momentarily held by the non-return effect of the pinion whereby the spring 25 is enabled to raise the pin 23 in its slot and so allow the gear segment to disengage the pinion as shown in Figure 3.

The stops 21 provided upon the segment lever are of such dimensions as not to engage the shoulders of the keys when the latter are in their inoperative position; for example, if the "5" key is depressed the stops 21 associated with the keys 1, 2, 3 and 4 will clear beneath the shoulders of those keys.

It will be appreciated that by pivoting the segment lever 18 substantially midway between its ends or midway of the key bank the whole mechanism can be accommodated in a casing which extends only slightly beyond the rear keys, this constituting an important feature of the present invention. It will also be observed that key actuation occurs at a high level in the machine and that the lever fulcrums are at a low level. This (or the converse) permits the five stops on the segment lever to swing into engagement with the five keys at angles not too far removed from the horizontal.

Instead of employing the actuating lever 22 and the auxiliary actuating lever 38 a single actuating lever cooperating with all of the keys 1 to 5 may be employed. Figure 4 of the accompanying drawings illustrates such a construction. The reference numeral 55 illustrates the actuating lever which is pivoted at 56 upon a spindle mounted in the machine. The upper part of the actuating lever extends beneath the keys 1, 2, 3, 4 and 5 and has its upper edge serrated as at 27. An arm 57 of the lever 55 carries a pin 58 which is accommodated in a slot 59 in an operating member 60 pivoted at 20 on the same axis as that upon which the segment lever 18 is pivoted. The end of the operating member 60 opposite to the point of pivotation 20 has a pin 23 which is accommodated in the slot 24 in the gear segment 17 and operates in the manner similar to that described in connection with Figure 1. The actuating lever 55 is maintained in the position shown in Figure 4 by means of a spring 61 which normally urges the actuating lever against a stop 62. When any one of the keys is depressed the actuating lever 55 is angularly displaced which displacement turns the operating member 60 about its pivot 20 thereby causing the gear segment 17 to be moved into engagement with the pinion 11.

Figure 5 of the drawings shows a lever system applicable to a machine having a full range of nine keys. The keys 1, 2 and 3 co-operate with an actuating lever 22 of similar construction to that illustrated in Figure 1 the keys 4 and 5 co-operate with an auxiliary actuating lever 38 as in Figure 1 while the keys 6, 7, 8 and 9 co-operate with a further auxiliary actuating lever 42 which is pivoted at 43 and provided with an arm 44 which co-acts with an arm 45 on the actuating lever 22. An auxiliary segment lever 46 is also provided for those keys which lie beyond the convenient range of the segment lever 18 for example for keys 6, 7, 8 and 9. The lever 46 is adapted to slide longitudinally in suitable guides provided in the machine and to be engaged by a pin 47 on the segment lever 18. The end of the auxiliary segment lever has a slot or its equivalent 48 in which the pin 47 is located. When the segment lever 18 is moved about its pivot the pin 47

travels along the slot without first engaging the auxiliary segment lever but after the segment lever 18 is moved through an angle corresponding with a pinion movement of for example five teeth and before movement of the sixth tooth is complete the pin 47 engages the end 39 of the slot so that the auxiliary segment lever serves to make the arrest for the sixth tooth movement and for the further movements up to, for example, nine teeth. For the purpose of this arrest the auxiliary segment lever is provided with stops 50 corresponding to the stops 21 on the segment lever 18. It will be appreciated that neither the auxiliary actuating lever nor the auxiliary segment lever moves when one of the keys is actuated which engage the main actuating or main segment levers. The former only come into operation when one of the keys within their range is depressed. A spring 51 is provided for returning the auxiliary actuating lever 42 to its initial position and the upper end of the lever may abut against a stop 52.

It will be seen from Figure 5 that the mechanism is so constructed that the casing containing the mechanism extends only slightly beyond the rear key 9.

Figure 8 illustrates a further form of the invention as applied to a partial keyboard machine embodying certain modifications designed with a view to eliminating the necessity of employing so far as possible the use of springs. The gear segment 17 is pivoted upon the segment lever 18 which is pivoted on the spindle 20 substantially midway between its ends as described in connection with Figures 1, 2 and 3. The reference numeral 22 indicates the actuating lever which is pivoted on the spindle 20 and has its upper edge of serrated form for the purpose above referred to. The actuating lever has a pin 23 which projects into a slot 24 on the gear segment 17. The slot 24 (Figure 8) differs from the slot 24 of Figures 1, 2 and 3 in that it is a straight slot with parallel sides the pin 23 being a working fit in the slot. The slot 24 is inclined so that a normal to the surface of the slot lies well above the pivot 20 of the segment lever so as to assist the teeth of the gear segment to move past the teeth of the pinion 11 or out of operative engagement therewith upon the return stroke. This construction of slot enables the spring 25 shown in Figures 1, 2, 3 and 5 to be dispensed with. Instead of employing the auxiliary actuating levers 38 illustrated in Figure 1, two independent auxiliary actuating levers 63 and 64 are provided the lever 63 being operated by the key 4 while the lever 64 is operated by the key 5. The auxiliary actuating levers 63 and 64 are pivoted on a spindle 65 and operate against a projection 66 on the main actuating lever 22 in a similar manner as described in connection with Figure 1. It is not necessary to employ springs for returning the auxiliary actuating levers 63 and 64 to their initial positions as they are returned thereto upon the return movement of the actuating lever 22 which in turn is moved to its initial position by the segment lever 18 through the medium of spring 18^a. Figure 8 also embodies a further modification in that the upper and lower limits of the travel of the keys is defined by the engagement of a projection or lug 67 on each key with the upper and lower edges of a slot 68 formed in the dividing partition 69 separating the adjacent banks of keys. The individual keys are returned to their initial position by means of springs which surround the re-

duced ends of the keys as shown in Figures 6 and 7 the reduced ends of the keys being guided in slots formed in the flange 70.

Similar systems of levers and gears are provided and associated with each bank of keys. The invention may be employed in conjunction with any suitable transfer mechanism and with any suitable zeroizing or cancelling mechanism.

Various changes may be made in the form and arrangement of the parts without departing from the working principles described. For example instead of employing an actuating lever or auxiliary actuating lever associated with a number of keys separate actuating levers may be employed for the several keys if so desired.

Although the invention has been described above in connection with the decimal system of notation it is also applicable to other notations for example the British monetary system.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment carried by said segment lever and means for causing the keys of the bank with which the segment lever is associated on both sides of the pivot on said lever to impart unidirectional motion thereto upon depression of one or other of said keys, means for restraining the rotational movement of the pinion in one direction said gear segment being adapted to engage and rotate the pinion in the unrestrained direction of its movement and to move past the teeth of the pinion or out of operative engagement therewith upon its return movement.

2. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment carried by the said segment lever, an actuating lever having a co-operating engagement with the said gear segment, and an auxiliary actuating lever, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate the pinion.

3. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment pivotally mounted on said segment lever, an actuating lever having a co-operating engagement with the said gear segment, an auxiliary actuating lever, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate a pinion, means for restraining the rotational movement of the pinion in one direction, said gear segment being adapted to engage and rotate the pinion in the unrestrained direction of its movement and to move out of operative engagement with the teeth of the pinion upon its return movement.

4. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substan-

tially midway between its ends, a gear segment pivotally mounted on said segment lever, an actuating lever and an operating member associated with said actuating lever, a pin and slot connection between said operating member and the gear segment to permit the gear segment to swing out of operative engagement with a pinion in one direction of its movement, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

5. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment carried by the said segment lever, an actuating lever having a co-operating engagement with the said gear segment, and an auxiliary actuating lever the upper edges of said actuating lever and auxiliary actuating lever having inclined surfaces which are so shaped as to permit appropriate extent of movement to be imparted to the gear segment, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate the pinion.

6. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment carried by said segment lever, an actuating lever and an auxiliary actuating lever the upper edges of which have inclined surfaces which are so shaped as to permit appropriate extent of movement to be imparted to the gear segment, a co-operating engagement between said actuating lever and the gear segment to permit the gear segment to swing out of operative engagement with a pinion in one direction of its movement, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

7. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment pivotally mounted on said segment lever, an actuating lever, the upper edge of said actuating lever being serrated the inclined surfaces of the serrations being so shaped as to permit appropriate extent of movement to be imparted to the gear segment, an operating member associated with said actuating lever, a co-operating engagement between said operating member and the gear segment to permit the gear segment to swing out of operative engagement with a pinion actuated thereby in one direction of its movement, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

8. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment pivotally mounted on said segment lever, an actuating lever and an auxiliary actuating lever, the upper edges of said actuating lever and auxiliary actuating lever having inclined surfaces which are so shaped as to permit the appropriate extent of movement to be imparted to the gear segment, a resilient connection between said actuating lever and segment lever or levers, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate a pinion, means for restraining the rotational movement of the pinion in one direction said gear segment being adapted to engage and rotate the pinion in the unrestrained direction of its movement and to move out of operative engagement with the teeth of the pinion upon its return movement.

9. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a plurality of stops on said segment lever to co-operate with the keys on their depression, a gear segment pivotally mounted on said segment lever, an actuating lever and an operating member associated with said actuating lever, a cooperating engagement between said operating member and the gear segment to permit the gear segment to swing out of operative engagement with a pinion actuated thereby in one direction of its movement, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression on one or other of said keys to rotate said pinion.

10. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a plurality of stops on said segment lever to co-operate with the keys on their depression, a gear segment carried by said segment lever, an actuating lever and an auxiliary actuating lever, the upper edges of said actuating lever or levers having inclined surfaces which are so shaped as to permit appropriate extent of movement to be imparted to the gear segment, a co-operating engagement between said actuating lever and the gear segment to permit the gear segment to swing out of operative engagement with a pinion in one direction of its movement, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

11. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment carried by said segment lever, an actuating lever, a resilient connection between said actuating lever and segment lever, a cooperating engagement between said actuating lever and the gear segment to permit the gear segment to swing

out of operative engagement with a pinion actuated thereby in one direction of its movement, an auxiliary actuating lever co-operating with said actuating lever, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

12. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a plurality of stops on said segment lever to co-operate with the keys on their depression, a gear segment pivotally mounted on said segment lever, an actuating lever, an auxiliary actuating lever co-operating with said actuating lever, the upper edges of said actuating lever and auxiliary actuating lever being serrated the inclined surfaces of the serrations being so shaped as to permit the appropriate extent of movement to be imparted to the gear segment, a resilient connection between said actuating lever and segment lever said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate a pinion, means for restraining the rotational movement of the pinion in one direction, said gear segment being adapted to engage and rotate the pinion in the unrestrained direction of its movement and to move out of operative engagement with the teeth of the pinion upon its return movement.

13. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a plurality of stops on said segment lever to co-operate with the keys on their depression, a gear segment carried by said segment lever, an actuating lever, the upper edge of said actuating lever being serrated, the inclined surfaces of the serrations being so shaped as to permit appropriate extent of movement to be imparted to the gear segment, an auxiliary actuating lever co-operated with said actuating lever, a connection between said actuating lever and the gear segment to cause the gear segment to engage a pinion actuated thereby in one direction of its movement and to permit the gear segment to swing out of operative engagement with the pinion in the other direction of its movement, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate said pinion.

14. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, an auxiliary segment lever, a lost motion connection between said segment lever and auxiliary segment lever, a plurality of stops on said segment lever and auxiliary segment lever to co-operate with the keys on their depression, a gear segment pivotally mounted on said segment lever, an actuating lever, a plurality of auxiliary actuating levers the upper edges of

said actuating lever and said auxiliary actuating levers being serrated the inclined surfaces of the serrations being so shaped as to permit the appropriate extent of movement to be imparted to the gear segment, a resilient connection between said actuating lever and segment lever, said actuating lever being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate a pinion, means for restraining the rotational movement of the pinion in one direction, said gear segment being adapted to engage and rotate the pinion in the unrestrained direction of its movement and to move out of operative engagement with the teeth of the pinion upon its return movement.

15. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway of the length of said bank, a gear segment carried by the said segment lever, an actuating lever having a co-operating engagement with the said gear segment and an auxiliary actuating lever, said actuating lever or levers being angularly displaced upon depression of one or other of the keys so as to cause the keys of the bank with which the segment lever is associated on both sides of the pivot of said segment lever to impart unidirectional motion thereto upon depression of one or other of said keys to rotate a pinion actuated thereby.

16. A calculating or adding machine as in claim 15, wherein said actuating lever is pivotally mounted substantially midway of the length of the bank of keys.

17. A calculating or adding machine comprising a plurality of banks of keys extending from the front to the rear of the machine and registering mechanism disposed in front of the said banks of keys and having in each bank of keys, an actuating lever actuated by said keys, a segment lever co-operating with said actuating lever, a gear segment pivotally mounted on said segment lever, said actuating and segment levers having fulcrums fixed in the framework of the machine and within the range between the registering mechanism and the farthest key.

18. A calculating or adding machine as in claim 15, wherein the segment lever and the actuating lever are pivotally mounted on a common fulcrum located at a low level in the machine.

19. In a calculating or adding machine of the type referred to, a segment lever extending along a bank of keys and pivotally mounted substantially midway between its ends, a gear segment pivotally mounted on said segment lever, means actuated by the said keys for imparting unidirectional motion to said segment lever on depression of one or other of said keys, a connection between said means actuated by the keys and the gear segment for causing the gear segment to move into engagement with a pinion actuated thereby, upon the downward movement of the said keys and for moving the segment out of operative engagement with the pinion on the upward movement when the keys return to their initial positions and means for restraining the rotational movement of the said pinion when the segment moves out of operative engagement therewith.

20. A calculating or adding machine as in claim 19, wherein the means actuated by the said keys comprises an actuating lever connected to the

gear segment and an auxiliary actuating lever the said actuating lever and auxiliary actuating lever having inclined surfaces with which the keys engage to impart appropriate movement to the gear segment.

21. In a calculating or adding machine comprising a plurality of banks of keys extending from the front to the rear of the machine and registering mechanism disposed in front of the said banks of keys, a segment lever extending along each bank of keys and pivotally mounted on a pivot extending transversely of the machine, the said

segment lever being disposed substantially midway of the length of the bank of keys and co-acts with the keys on both sides of the said pivot, a gear segment carried at the forward end of each segment lever co-acting with the said registering mechanism and means for causing the keys of the bank with which the segment lever is associated on both sides of the pivot of said lever to impart unidirectional motion thereto upon depression of one or other of the keys, the said segment lever moving in the plane in which the said keys move.

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