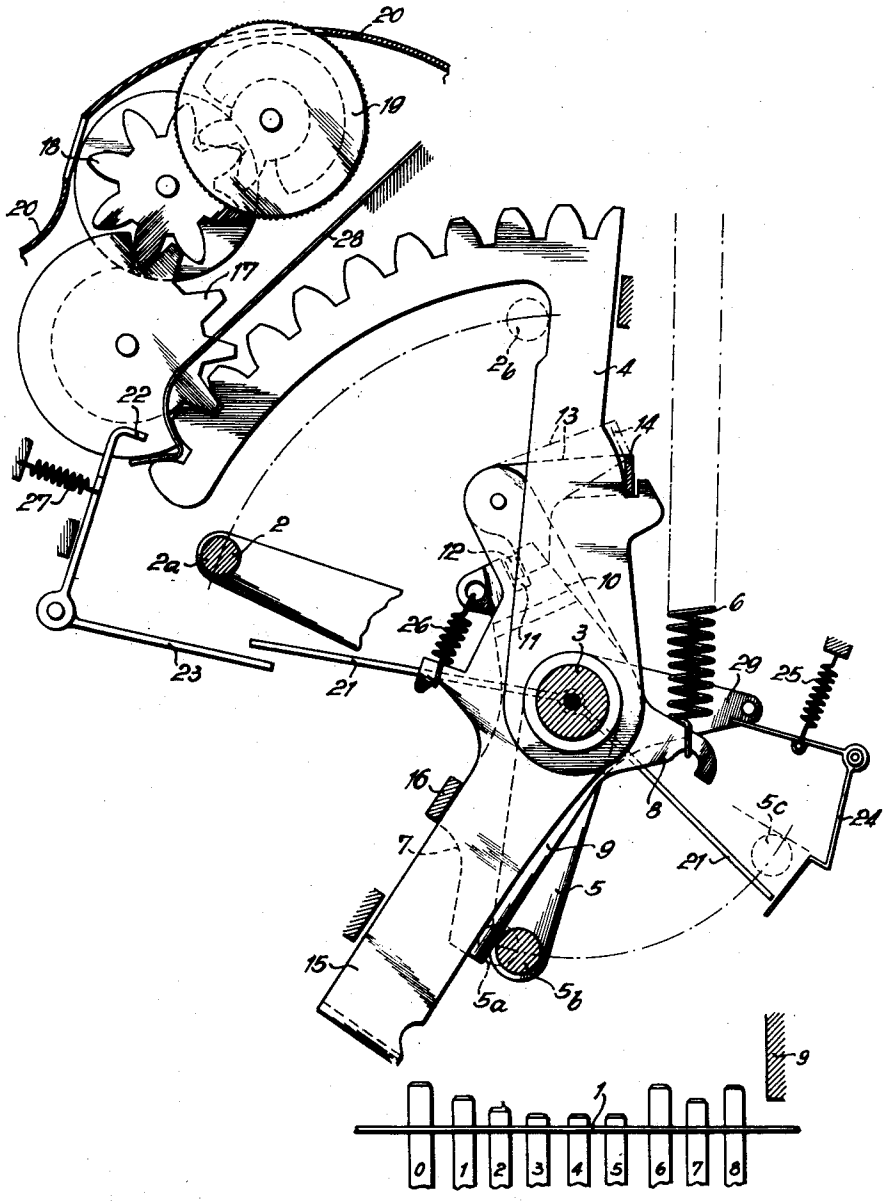
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TEN-KEY SETTING MECHANISM

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TEN-KEY SETTING MECHANISM

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This invention relates to a setting mechanism for ten-key calculating machines, adding machines, accounting machines and the like which makes possible the correction of any ordinal integer previously introduced by the keys.

In accordance with the invention, manually-operated members are provided for the displacement of setting mechanism elements to correct values introduced by the keys. By means of these manually-operated members, a value shown to the operator, for example in an indicating mechanism of the setting mechanism, can be modified, and this modification can be effected at any decimal position and there is no necessity for the complete or partial cancellation of the setting mechanism, as in prior machines.

The manually-operated members may comprise, for example, milled wheels, by means of which the elements which have been set in accordance with a keyed in value can be reset as to value.

The construction and operation of an illustrative embodiment of a setting mechanism embodying features of the invention will be described in detail below with reference to the accompanying drawing which shows a setting mechanism with the operating elements for one ordinal position.

As shown in the drawing, the reference numeral 1 designates a pin carriage into which values are introduced in known manner. A reset rocker arm 2 is rotatably mounted for oscillation about the axis of a shaft 3 in response to depression of a function control key. The shaft 3 carries loosely mounted thereon toothed sectors 4, only one being shown, and the cooperating elements for this sector only being shown with it. Also loosely mounted on the shaft 3 is a three armed intermediate member 7 having an arm 8 to which is secured a spring 6, for normally urging member 7 in a counterclockwise direction, an arm 9 which carries a lug 16 for cooperation with a value scanning lever 15, and a third arm 10 which is formed with a radial slot 11. In slot 11 is seated a pin 12 which is connected to a two armed coupling lever 13 which has a lever arm provided at its end with a lug 14 adapted to be received in a notch formed in the sector 4 to provide a mechanical connection therewith. Lever 13 is rotatably mounted on the leg of value scanning lever 15 which is loosely mounted on shaft 3. Lever 15 and intermediate member 7 are connected by means of a traction spring 26. A two armed lever 21 is pivoted at the axis of the shaft 3, and arranged to cooperate with one arm of lever 21 is a second lever 23 which carries a locking rocker arm 22 having an end adapted to engage a detent spring 28 for pressing this spring between the teeth of the toothed sector 4. A spring 27 normally urges the rocker arm 22 out of engagement with the stop spring 28. The teeth of each of toothed sectors 4 mesh with the teeth of an intermediate wheel 17 which in turn mesh with the teeth of a numbered indicating wheel 18 which is visible

through an opening in the cover 20. The indicating wheel 18 meshes with a manually operable milled wheel 19 which extends partly through another aperture in the cover of the machine. Rotation of milled wheel 19, therefore, cause circumferential displacement of sector 4 and causes the spring to be lifted out of the teeth of the sector when the rocker arm 22 is not pressing upon the spring.

A pawl 24 acted on by a spring 25 is positioned to engage and latch the other arm of lever 21 for temporarily holding it against movement. A rocker arm 29 which may be integral with a rocker arm 5 is rotatable about the axis of shaft 3 for movement in the path of an arm of the pawl 24 for disengaging it from the lever 21.

In operating the above-described machine, a value to be introduced into the machine is set into the pin carriage 1 by means for a conventional ten-key keyboard. A representative setting of the pin carriage is illustrated in the drawing by the raised pin corresponding to numeral value "6." Pin carriages, such as the pin carriage 1 of the embodiment shown, are well known in the art and further illustration or description is believed unnecessary. Also, the means for rocking the arms 2, 5, and 29 are not illustrated, it being sufficient to state that the rocking of such arms under the control of a main operating shaft, is well known in the art, such as the operating shaft 50 shown in the U.S. Patent No. 1,812,020.

Cyclic operation of a drive mechanism in the machine, in response to the aforementioned function control key, causes the rocker arms 2, 5, and 29 to oscillate in timed sequence. In the initial phase of the cycle, reset rocker arm 2 is rotated clockwise from its initial rest position 2*a* to the position 2*b*. During such movement, rocker arm 2 rotates all sectors 4 from their respective differentially set positions to a common zero position.

As soon as rocker arm 2 has reached position 2*b*, rocker arm 5 starts to move counterclockwise, this being the initial phase in setting up a new value in sectors 4 during the current cycle. In its movement from its initial rest position 5*a* to an intermediate position 5*b*, it is followed, by reason of the traction of spring 6 upon arm 8, by three-armed intermediate member 7, which is freely rotatable on shaft 3. When arm 5 is in its initial position, it stands in a position 5*a* which is somewhat clockwise from the position 5*b* shown and, due to spring connection 26, tends to rock the scanning lever 15 in a similar direction; however, the lever 15, at such time, is blocked by a portion of the framework, as shown, and thus, spring 26 is placed under additional tension and lug 16 on member 7 is rocked clockwise away from lever 15. The movement of member 7 relative to lever 15 causes the coupling lever 13 to rock counterclockwise out of coupling relationship with sector 4. This is the relationship of the various parts at the beginning of an operating cycle. Subsequently, as a result of the displacement of rocker arm 5 from position 5*a* to position 5*b*, and the corresponding movement of the intermediate member 7 counterclockwise relative to scanning lever 15 which is held against the framework by spring 26, the coupling lever 13 is positively displaced clockwise and the lug 14 is directed into the notch of the sector 4, thereby coupling the latter with the value scanning lever 15. The rocker arm 5 then continues in its movement to position 5*c*. At the same time, rocker arm 2 moves back from position 2*b* to its initial position 2*a*. Acted upon by lug 16 of arm 9, the value scanning lever 15 follows rocker arm 5. Through the previously-mentioned connection of sector 4 with value scanner 15, the sector 4 moves with the scanner. The scanner 15 fol-

lows the rocker arm 5 until it is stopped by the pin corresponding to the value "6," shown set up in the pin carriage 1, while the rocker arm 5 continues on to position 5c. The displacement of the sector 4 as it follows value scanner 15 causes corresponding rotation of the intergeared wheels 17, 18, and 19 so that the indicator wheel shows the number "6" to the operator through the window in the machine cover 20.

Shortly before the completion of the counterclockwise rotation of the rocker arm 5, i.e., before position 5c is reached, the arm of lever 21 is engaged by arm 5 and carried along with it. The other arm of lever 21 in turn acts upon lever 23 to move the locking arm 22 clockwise against spring 28 to lock the sector 4 in set position. As position 5c is reached by the rocker arm 5, pawl 24 drops, under the action of spring 25, behind lever 21, and as a result rocker arm 22 is held in locked position. When the rocker arm 22 is in this position, the sector 4 is locked until near the end of the current operating cycle.

Rocker arm 5 now starts its return movement from position 5c to position 5a, rotating clockwise until it engages arm 9 of the intermediate member 7. Continued movement of arm 5 rotates intermediate member 7 clockwise relative to the scanner 15, against the tension of spring 26, since the scanner 15 is held stationary by virtue of its connection through coupling lever 13 to locked sector 4. Clockwise rotation of member 7 relative to scanner 15, lifts the lug 14 out of the notch of sector 4. The mechanical connection between sector 4 and scanner 15 is thus released, and scanner 15 together with intermediate member 7 are free to be returned into zero position under the action of rocker arm 5. During the last portion of the return movement of rocker arm 5, the pawl 24 is rocked counterclockwise by rocker arm 29 to release lever 21 and rocker arm 22 is retracted from engagement with the spring 28 by return spring 27 which is free to operate upon release of the lever 23 by the arm of lever 21. At this point, the sector 4 stands at its differentially set position held by the detent action of spring 28, but is free to be readjusted by means of adjusting wheel 19. The previously mentioned main operating mechanism resets the pin carriage to initial position in the usual manner. Since the pin carriage resetting means forms no part of the invention, further detailed description is omitted.

By means of milled wheel 19, the operator can selectively change or correct the value to which sectors 4 are adjusted as indicated by the indicator wheel 18. A new value may also be introduced into the pin carriage 1 without disturbing the current value set up in the sectors 4. Clearing of the sectors before setting up a new value in the pin carriage is thus unnecessary because the sectors 4 are automatically brought into the zero position by the action of rocker arm 2 before the new value is set up in the sectors.

Since the reset arm 2 is rocked from the position 2a to 2b and back to 2a thus resetting the sectors 4 and the numeral wheels 18 to zero each time that the main operating mechanism is operated, the necessity for a special resetting key is eliminated. In those cases where the operator merely wishes to reset the sectors 4 and the numeral wheels 18 to zero without setting up a new value in the sectors, this is accomplished by initiating an operation of the main operating mechanism with no value previously having been entered in the pin carriage. It is well known that a zero stop (not shown) but similar to the zero stop 41 of the previously mentioned Patent No. 1,812,020, or the zero stop 76 of the U.S. Patent No. 2,176,561 may be employed for this purpose, and in fact is customarily provided on all ten-key machines having pin carriages. Thus, in those orders where a zero stop is effective to prevent movement of the scanning lever 15, the operation of the machine is a "blank" operation resulting only in resetting the sectors 4 and the numeral wheels 18 to zero.

The setting of the sectors 4, only one of which is shown, together with the indicator numeral wheels 18 to a selected value representative position under the control of the pin carriage, as previously described, prepares the machine for a subsequent calculation, in the next machine cycle, i.e., the sectors 4 serve to adjust means for controlling the accumulator actuators, print mechanisms, value storage and factor mechanisms, or the like; however, since the invention is directed only to the means for setting the sectors 4 and the numeral wheels under the control of the pin carriage 1 or under the control of the manually adjustable discs 19, further mention of the subsequent control exerted by the sectors 4 is believed unnecessary.

It will be obvious that various other changes and modifications may be made in the embodiment described above and shown on the drawings and it is intended, therefore, that all matter contained in the foregoing description and in the drawings shall be interpreted as illustrative only.

What I claim and desire to secure by Letters Patent is:

1. A calculating machine comprising a selectively settable pin carriage; a rotatable gear sector; an indicator numeral wheel constantly entrained with said gear sector; and means for rotating said gear sector and indicator wheel differentially in accordance with the value set up in said pin carriage; comprising a rotatable scanning lever coaxial with said sector for scanning the pins in said pin carriage; said scanning lever being rotatable from an initial position to a differential arrested position in engagement with a set pin in said pin carriage; coupling means carried by said scanning lever and adjustable from an ineffective to an effective position to couple said sector to said scanning lever; a rotatable intermediate lever coaxial with said sector and resiliently connected to said scanning lever for concurrent movement therewith and for limiting movement relative thereto, said intermediate lever being operatively connected to said coupling means and being spring-urged to rotate said scanning lever from initial position to engage a set pin; cyclically operable drive mechanism comprising a reset rocker arm and a rotatable rocker arm coaxial with said gear sector and oscillatable in timed sequence, said reset rocker arm being operable from a normal position during the initial part of the cycle to engage and restore said gear sector to initial position, said rotatable rocker arm engaging and normally restraining said spring-urged rotation of said intermediate lever and being operable from a normal position, following restoration of said gear sector, to release said intermediate lever for said limited movement relative to said scanning lever to adjust said coupling to effective position and thereafter to enable said intermediate lever, said scanning lever and said coupled gear sector to move as a unit until differentially arrested by a set pin, said reset rocker arm being restored to normal position concurrently with the operation of said rotatable rocker arm; a detent for retaining said gear sector in differentially arrested position; said rotatable rocker arm being restored to normal position during the terminal portion of the cycle to first engage and move said intermediate lever relative to said scanning lever to adjust said coupling means to ineffective position and thereafter to engage and move both said intermediate lever and said scanning lever to initial position independently of said sector.

2. A calculating machine as defined in claim 1 including means for locking said detent in retaining position; means operable by said rotatable rocker arm for enabling said locking means; and a second rotatable rocker arm rotatable in timed sequence with said first

named rotatable rocker arm for disabling said locking means following adjustment of said coupling means to ineffective position.

3. A calculating machine as defined in claim 1 including manually operable means engaged with said indicator and operable to readjust the gear sector to any selected value representing position after said locking means is disabled.

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