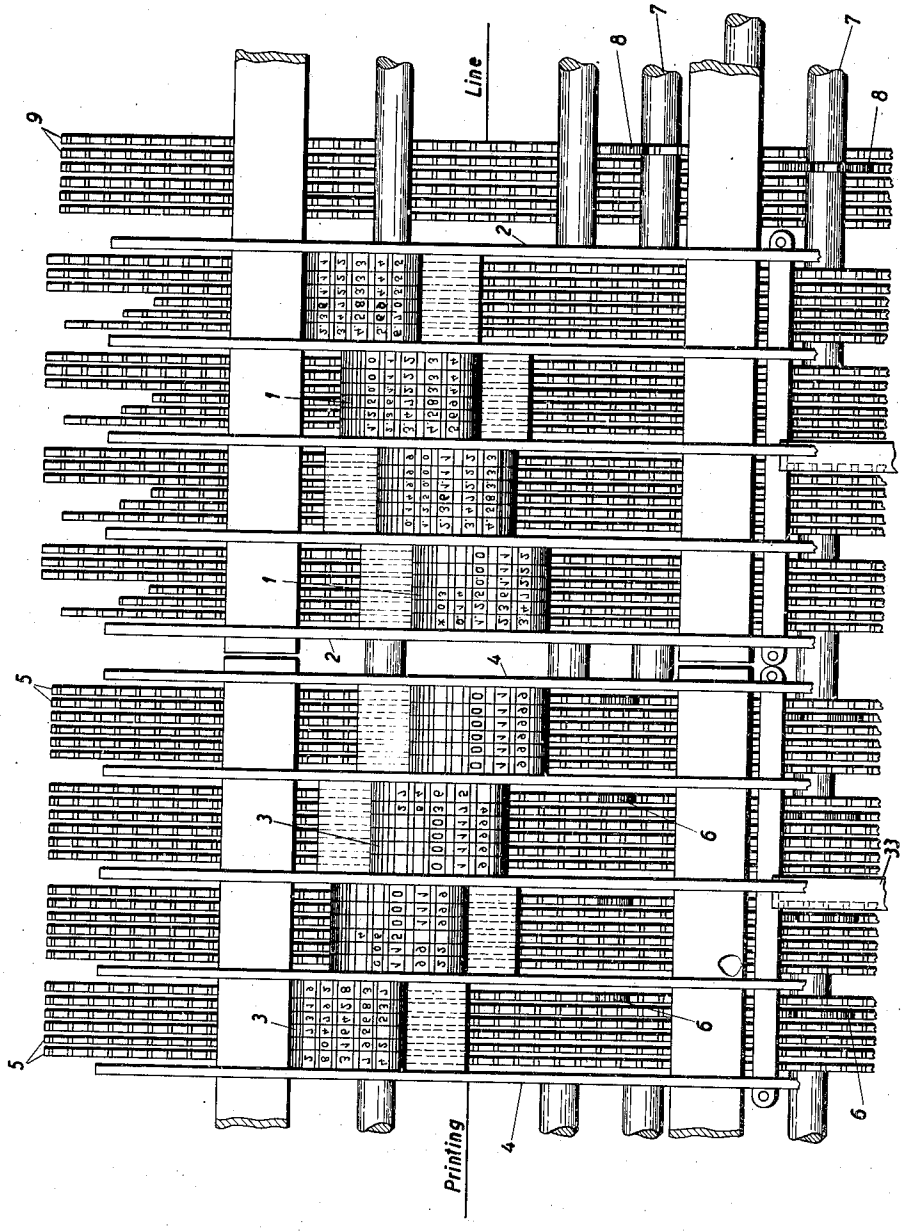
Sept. 17, 1940. K. AURBACH 2,214,895

SERIAL NUMBER MECHANISM

Filed June 2, 1937 3 Sheets-Sheet 1

Fig. 1



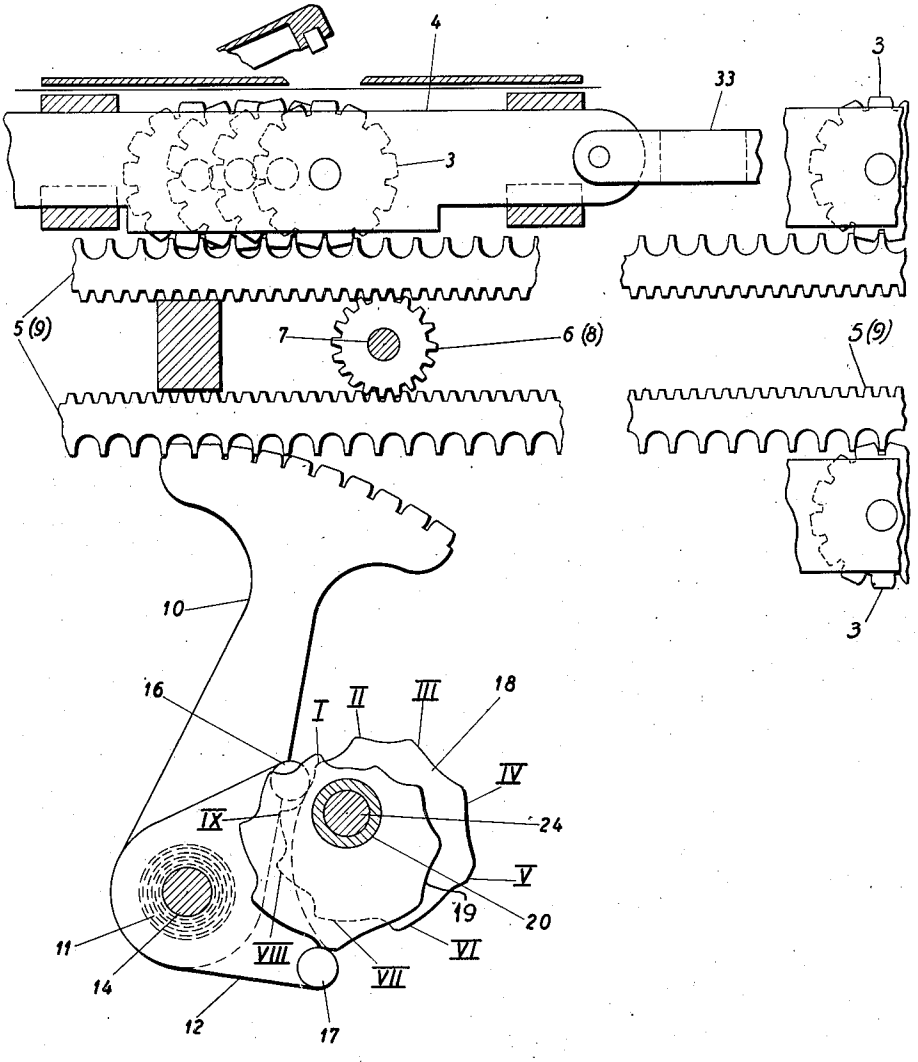
Inventor,
Kurt aurbach
By Knight Bros
His Attorneys

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Fig. 2.



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Fig. 3

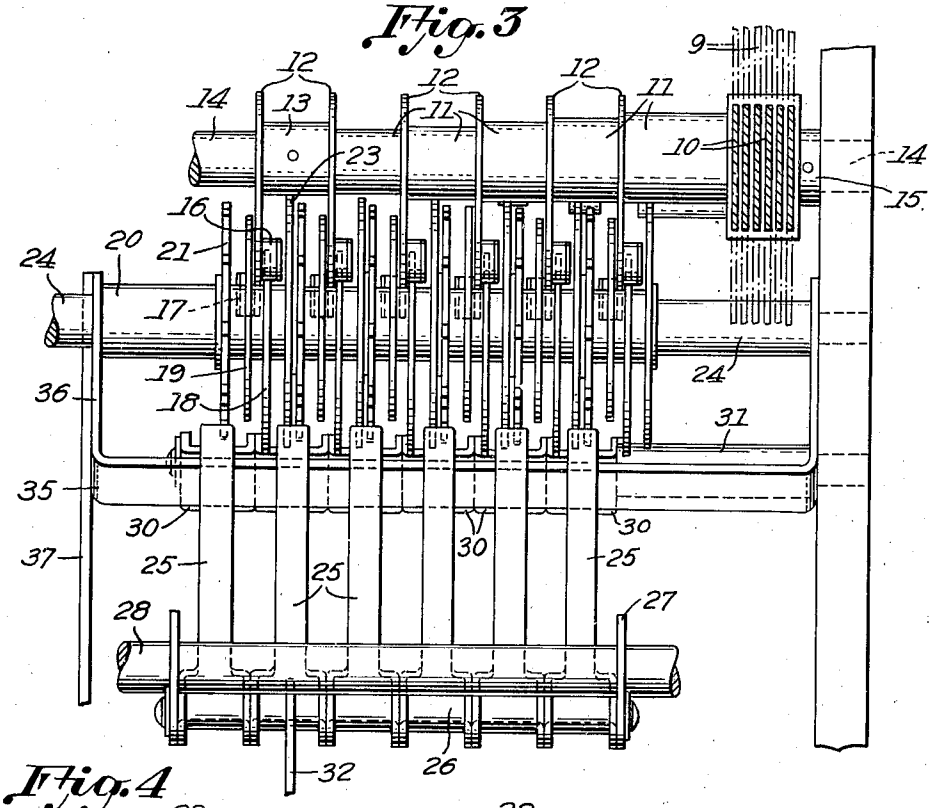


Fig. 4

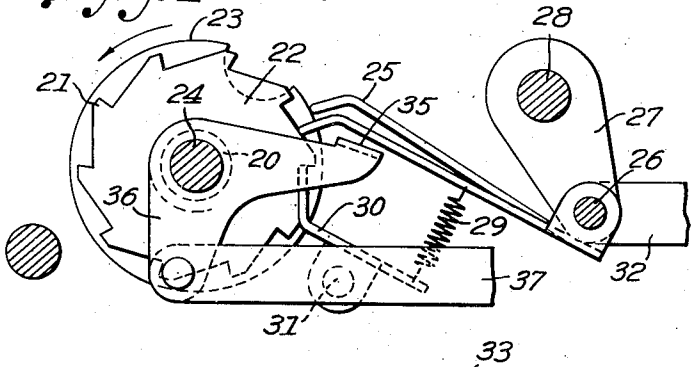


Fig. 5

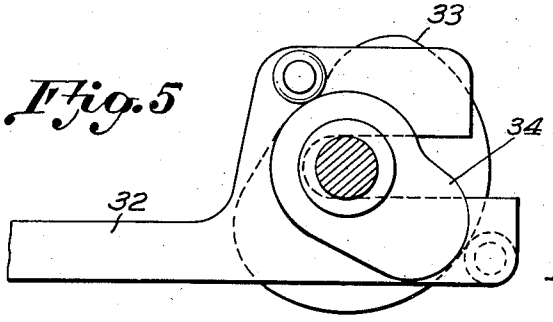
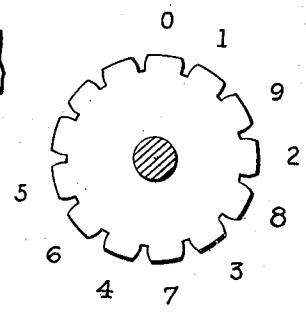


Fig. 6



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Patented Sept. 17, 1940 2,214,895

UNITED STATES PATENT OFFICE

2,214,895

SERIAL NUMBER MECHANISM

Kurt Aurbach, Bielefeld, Germany, assignor to Anker Werke A.-G., Bielefeld, Germany

Application June 2, 1937, Serial No. 145,951
In Germany August 21, 1936

14 Claims. (Cl. 101—72)

The invention relates to a serial number mechanism for cash registers, calculating machines, bookkeeping machines, or similar machines, and particularly to the means providing for the progression of the serial number.

In the known machines the device for advancing the serial number is so designed that the indicators or type members for the serial number are always moved forward or set in the same direction.

By the arrangement of type members for the amounts, which are driven by longitudinally movable elements, such as rack bars, or by oscillating elements, such as sectors, it is desired particularly for constructional and spacial reasons to drive the type members for the serial number by the same kind of driving means as is used for the amount type members.

This problem is solved according to the invention by arranging for the shifting or setting of the indicating or type members for the serial number in different directions.

The use of this idea in machines whose printing devices are designed for printing in columns upon a record sheet results in the advantage, according to the invention, that while employing a single drive for shifting the serial number, the type members for the serial number can be spacially arranged in any desired way; that is, that the serial number type members can be mounted, for example, either at the left or at the right of the amount type members, or between the amount type members.

Furthermore, the type member or type members for the serial number can be moved away from the printing line and thereby rendered inoperative, if the serial number is not to be brought to print upon the record sheet at all.

Likewise the device according to the invention can be so built that a plurality of sets of type members for the serial number can be mounted side by side in a movable frame, so that they come to print in different columns of a record sheet, like the amount type members.

One illustrative form of the invention is shown in the drawings and described in the specification.

Fig. 1 is a plan view of the printing mechanism.

Fig. 2 is a vertical section through the printing mechanism.

Fig. 3 is a plan view of the mechansm for advancng the serial number.

Fig. 4 is a vertical section of a part of the mechanism for advancing the serial number.

Fig. 5 is a vertical section of a part of the driving mechanism.

Fig. 6 is a side elevation of one of the type wheels, indicating one arrangement of the type in accordance with the invention.

By way of example the invention is shown as applied to a printing mechanism for printing the serial number upon record sheets. It can be used equally well for setting number elements for visual indicators and wherever the term "number element" appears in this specification it refers to either type members or indicators.

The printing mechanism consists of for example four similar and correspondingly set amount type members 1, which are mounted in a common frame 2 and which can be moved into the printing line selectively for the purpose of printing in different columns of a record sheet.

In the illustrative example there are provided number elements 3 in the form of type members (Figs. 1 and 2) at the left of the amount type members for printing the progressing serial numbers. These type members 3 are mounted in a frame 4 and are driven by means of rack bars 5. The multiple arrangement of the type members 3 corresponds to the multiple arrangement of the amount type members according to French Patent No. 806,599, which makes it possible to print several record sheets at the same time. The type members 3 can be shifted selectively to the printing line, by link 33, for the purpose of printing in different columns of a record sheet, or they can be entirely removed from printing position.

The type on the sets of wheels 3 are so arranged that only the set of wheels in position to coact with the printing platen presents the proper serial number type on the top position of the wheels. The uppermost type on the remaining sets of wheels differ from the true number to be printed by the number of types displaced by the rotation of the wheels by their movement over the racks 5 when the member 33 is actuated to select a group of type for printing. Proper allowance for the proper positioning of the type to printing position can be made in the initial displacement of the type faces on the wheels 3.

With rack bars 5 mesh toothed wheels 6, while toothed wheels 8 engage in rack bars 9. The toothed wheels 6 and 8 are rigidly mounted upon shafts 7. In the teeth on the bottom of rack bars 9 engage sectors 10 (Figs. 1 and 2), which are mounted on tubes 11, whose opposite ends carry roller arms 12. One of the roller arms 12 is mounted by a hub 13 upon a shaft 14 which carries the tubes 11. This shaft has mounted on its other end by a hub 15 one of the sectors 10. The rollers 16 and 17 of the roller arms 12 co-

operate respectively with cam disks 18 and 19, which are joined together by tubes 20. Each tube 20 carries in addition a driving wheel 21 (Figs. 3 and 4) and a disk 23 provided with a notch 22. The units formed by the parts 18—23 are rotatably mounted upon a shaft 24. The disk 23 at the extreme right in Fig. 3, for the highest order of the serial number mechanism, has no function in the machine but it may be desirable from a manufacturing standpoint to have the unit for this order identical with the others. Upon the ratchet driving wheels 21 operate driving members 25 in the form of pawls, which are loosely mounted upon a shaft 26. The shaft 26 is fixed in two levers 27, which swing upon an axis 28. With each driving wheel 21 works also a pawl 30, which is under the pull of a spring 29, this spring also holding the driving pawl 25 against the ratchet wheels 21. These pawls 30 are rotatably mounted on a shaft 31 and prevent a retrograde movement of the driving wheels 21. The actuation of pawls 25 is accomplished by means of a forked rod 32 (Figs. 4 and 5) and cams 33, 34.

In order entirely to interrupt the advance of the serial number at certain machine operations, there is mounted upon the shaft 24 a yoke 35, which engages under the entire set of pawls 25 (Fig. 4). An extension 36 of the yoke 35 is connected with a rod 37, which is controlled by special keys or by the setting means which determines the kind of operation the machine is to execute. Neither of these control means is shown.

The operation of the described device is as follows:

In each machine operation the pawls 25 execute a forward and backward movement, which normally is imparted only to the units place of the serial number counting mechanism, while this movement in the other places is rendered inoperative by the fact that the pawls 25 for the higher orders rest upon the peripheries of the disks 23. Only at the passage of a driving wheel 21 from 9 to 0 does the next higher pawl 25 drop into the recess 22 of the next lower disk 23 and cause a shift of the next higher driving wheel.

An important novel feature of the invention is the mechanism represented by the cam disks 18 and 19, which by their particular shape make it possible to set the number elements by reciprocating setting means, in spite of the fact that the driving means has a continuous forward movement, and at the same time to limit the movement of the number elements in their passage from 9 to 0 to two number divisions of the number element.

The cam disks 18, 19 are so shaped that starting from the zero position in Fig. 2, the position marked I of cam disk 18 is reached by a movement of a single division, the positions marked II–V, each by two divisions, the position marked VI by a single division, and the positions marked VII–IX each by two divisions of the type wheels (compare Figs. 2 and 6). Consequently the type wheels 3 are moved by the parts 12, 14 or 11, 10, 9, 8, 7, 6, from the zero position into the positions 1, 2, 3, 4, 5, then back into the positions 6, 7, 8, 9, 0. This arrangement for advancement of the serial number has been chosen because the transition from 9 to 0 which must take place in the opposite direction to the advance of the numbers constitutes nine divisions and such a large shifting motion would have an unfavorable action upon the whole driving mechanism, if the type wheels were always advanced by just one position at a time and then had to move back through the whole distance at once.

I claim:

1. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a number element having a sequence of numbers arranged thereon in two interspersed series wherein the sequence proceeds in opposite directions in the two series, said number element being movable to different positions to bring the different numbers thereon to operative position, and cam means for shifting said number element to said different positions according to the sequence of said numbers, said cam means being adapted to move said number element in different directions in following said sequence.

2. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a number element movable to different positions to bring different numbers thereon to operative position, and a cam device for shifting said number element to said different positions in a definite sequence, said cam device being adapted to move said number element in different directions in following said sequence, said cam device being shaped to cause said number elements to move through different distances in successive shifts.

3. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; each number element having its individual operating means comprising a cam device and follower and gearing connecting the follower with the number element, each cam device having connected to it a driving wheel, driving members for actuating the driving wheels; each cam device being adapted to shift its number element in different directions to bring into operative position successively first a series of numbers progressing in one direction on the number element and then a series of numbers progressing in the opposite direction.

4. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; each number element having its individual operating means comprising a cam device and follower and gearing connecting the follower with the number element, each cam device having connected to it a driving wheel, reciprocating pawls for actuating the driving wheels; each cam device being adapted to shift its number element in different directions to bring into operative position successively first a series of numbers progressing in one direction on the number element and then a series of numbers progressing in the opposite direction.

5. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; each number element having its individual operating means comprising a cam device and follower and gearing

connecting the follower with the number element, each cam device having connected to it a driving wheel and each cam device except the one for the highest order number element having connected to it a transfer disk adjacent the driving wheel for the next higher order; driving members for actuating said driving wheels, the driving member for each order except the lowest being controlled by the adjacent transfer disk so as to be effective only when the transfer disk is in a certain angular position corresponding to the nine position of the number element with which it is associated; each cam device being adapted to shift its number element in different directions to bring into operative position successively first a series of numbers progressing in one direction on the number element and then a series of numbers progressing in the opposite direction.

6. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; each number element having its individual operating means comprising a cam device and follower and gearing connecting the follower with the number element, each cam device having connected to it a driving wheel, pawls mounted on a common reciprocating frame for actuating the driving wheels; each cam device being adapted to shift its number element in different directions to bring into operative position successively first a series of numbers progressing in one direction on the number element and then a series of numbers progressing in the opposite direction.

7. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; each number element having its individual operating means comprising a cam device and follower and gearing connecting the follower with the number element, each cam device having connected to it a driving wheel, driving members for actuating the driving wheels; means including a yoke adapted to act upon all of the pawls to prevent them from operating the driving members; each cam device being adapted to shift its number element in different directions to bring into operative position successively first a series of numbers progressing in one direction on the number element and then a series of numbers progressing in the opposite direction.

8. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a set of number elements for a plurality of orders, each movable to different positions to bring different numbers thereon to operative position; means for moving each number element step-wise in one direction and then step-wise in the opposite direction to bring the numbers thereon into operative position in sequence, the numbers being arranged on the number element so that the numbers of the second part of the sequence are interspersed with and run in the opposite direction to the numbers of the first part of the sequence; the means for moving said number elements being operative to move each number element only one step when the next lower number element executes the last step of its sequence, adjacent number elements being movable simultaneously in opposite directions.

9. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a number element having a sequence of numbers arranged thereon in two interspersed series wherein the sequence proceeds in opposite directions in the two series, and means for shifting said number element comprising a member having a reciprocating motion, and means for moving said member stepwise in one direction and then stepwise in the opposite direction, to bring the numbers on said number element to operative position in sequence.

10. In a device of the class described, a rotary operating member comprising a cam device, means for imparting a step-by-step movement to said operating member constantly in the same direction for an indefinite number of revolutions, a number element having a sequence of numbers thereon in two interspersed series running in opposite directions along said number element, and connecting means between said operating member and said number element comprising a follower engaging said cam device adapted to convert the rotary motion in one direction of said operating member into a step-by-step to and fro motion of said number element.

11. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a rotary operating member, means for imparting a step-by-step movement to said operating member constantly in the same direction for an indefinite number of revolutions, a number element having a sequence of numbers arranged thereon in two interspersed series wherein the sequence proceeds in opposite directions in the two series, and connecting means between said operating member and said number element adapted to convert the rotary motion in one direction of the former into a step-by-step motion of the latter, first in one direction, to bring the numbers of said first series sequentially into operative position, and then in the opposite direction, to bring the numbers of said second series sequentially into operative position.

12. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a plurality of number type elements mounted to present their type at different printing lines in the machine, said type elements being mounted so as to be movable as a group to remove the same from said printing lines when the serial number is not to be printed, a rotary operating member, means for imparting a step-by-step movement to said operating member constantly in the same direction, and connecting means between said operating member and each of said number type elements adapted to convert the rotary motion in one direction of the former into step-by-step to and fro motions of the latter.

13. In a device for advancing the serial number in cash registers, calculating machines, bookkeeping machines, and the like, a plurality of groups of number type elements mounted in a shiftable frame in position to print in different columns of a record sheet, said groups being staggered so that by shifting said frame any one group can be brought to printing position, the other groups being then out of printing position; a rotary operating member, means for imparting a step-by-step movement to said operating member constantly in the same direction, and

connecting means between said operating member and each of said number type elements adapted to convert the rotary motion in one direction of the former into step-by-step to and fro motions of the latter.

14. In a device of the class described, a number element, a positioning device for said number element comprising a rotary cam member, means for imparting step-by-step rotary movement to said cam member continuously in one direction, a transmission mechanism between said cam member and said number element comprising a follower engaging said cam member, said cam member being adapted to impart to said follower, and thereby to said number element, a step-by-step to-and-fro movement, the positions in which said number element is halted in its movement in one direction being different from, and interspersed with, the positions in which said number element is halted in its movement in the opposite direction, a sequence of numbers being positioned on said number element so as to be brought sequentially into operative position as the number element is halted during the successive steps of its movement.

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