

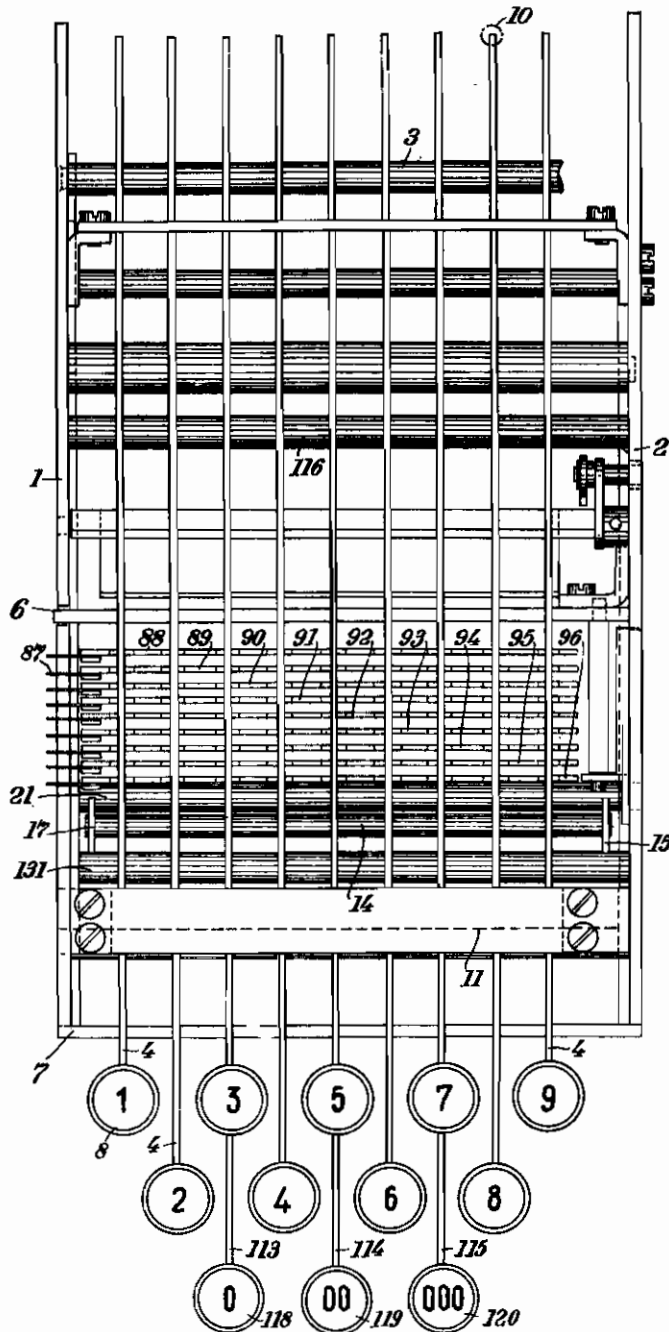
PUBLISHED
MAY 25, 1943.
BY A. P. C.

J. SOBISCH
DECADIC KEYING MECHANISM FOR ACCOUNTING
MACHINES OR THE LIKE
Filed June 14, 1939

Serial No.
279,077

7 Sheets-Sheet 1

Fig. 1.



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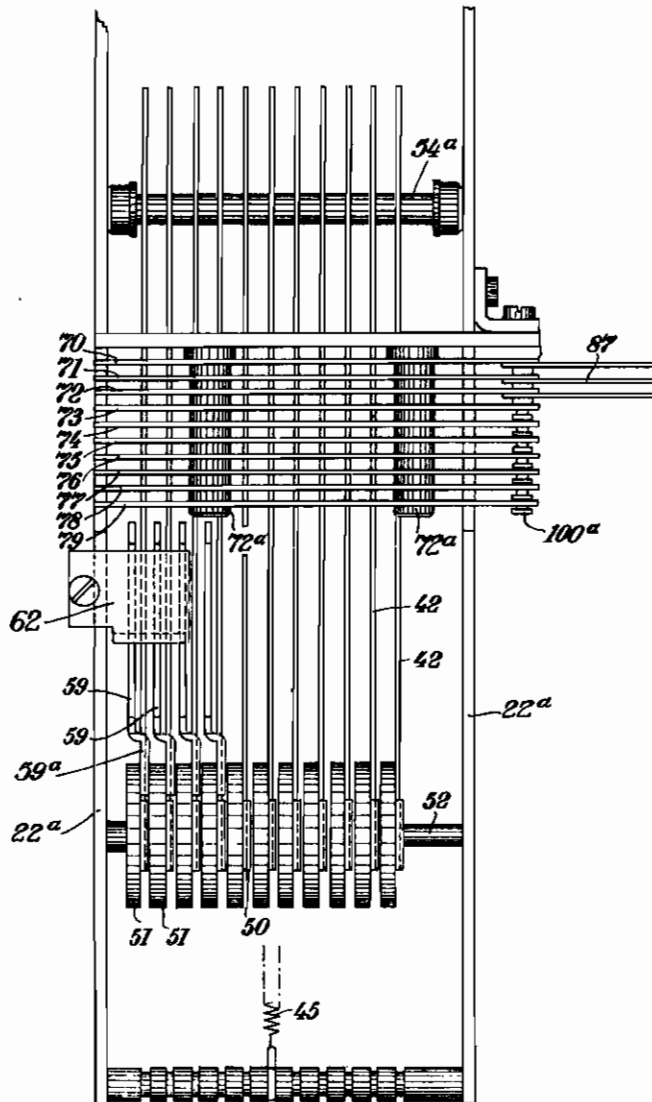
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7 Sheets-Sheet 2

Fig. 2.



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7 Sheets—Sheet 3

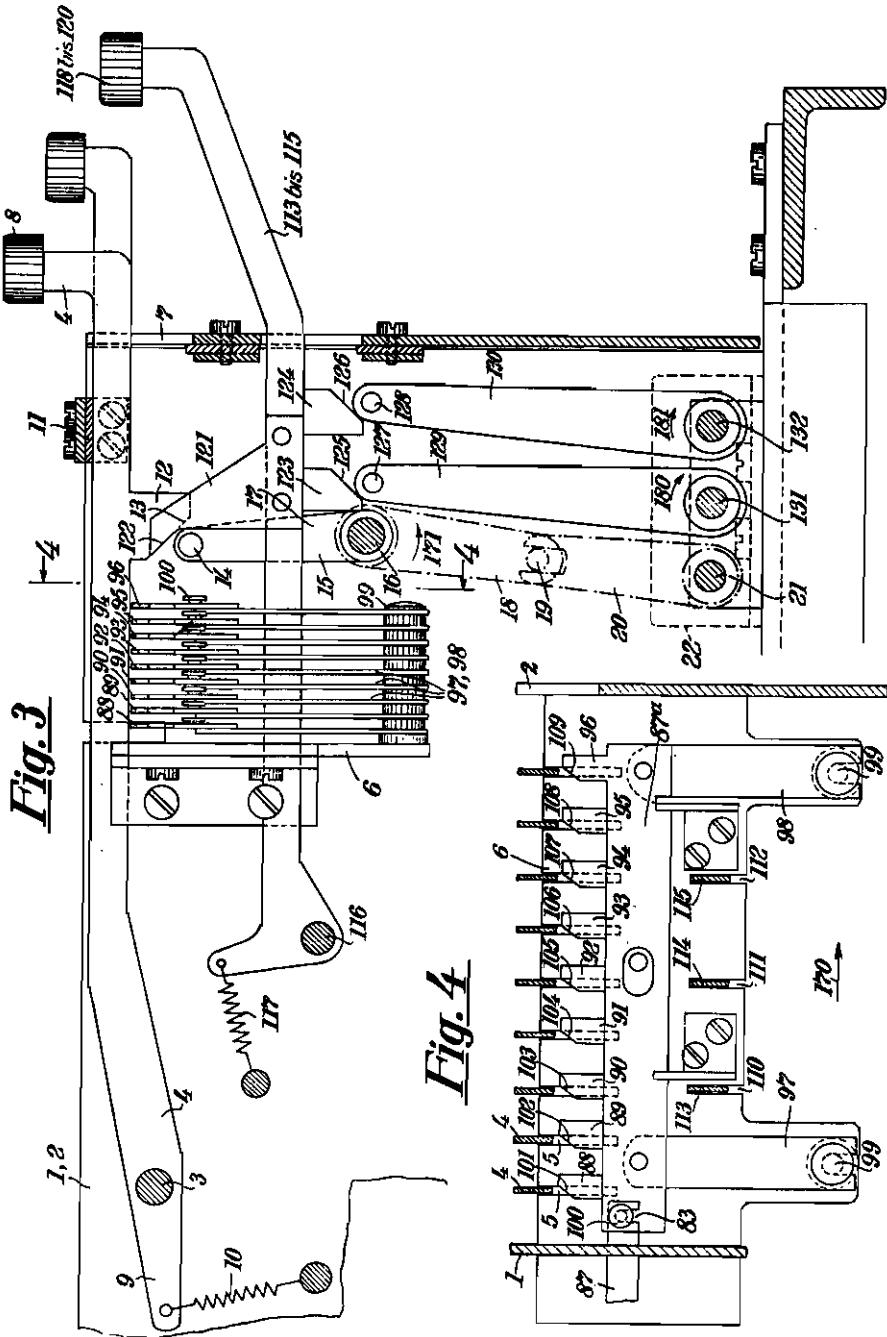


Fig. 3

Fig. 4

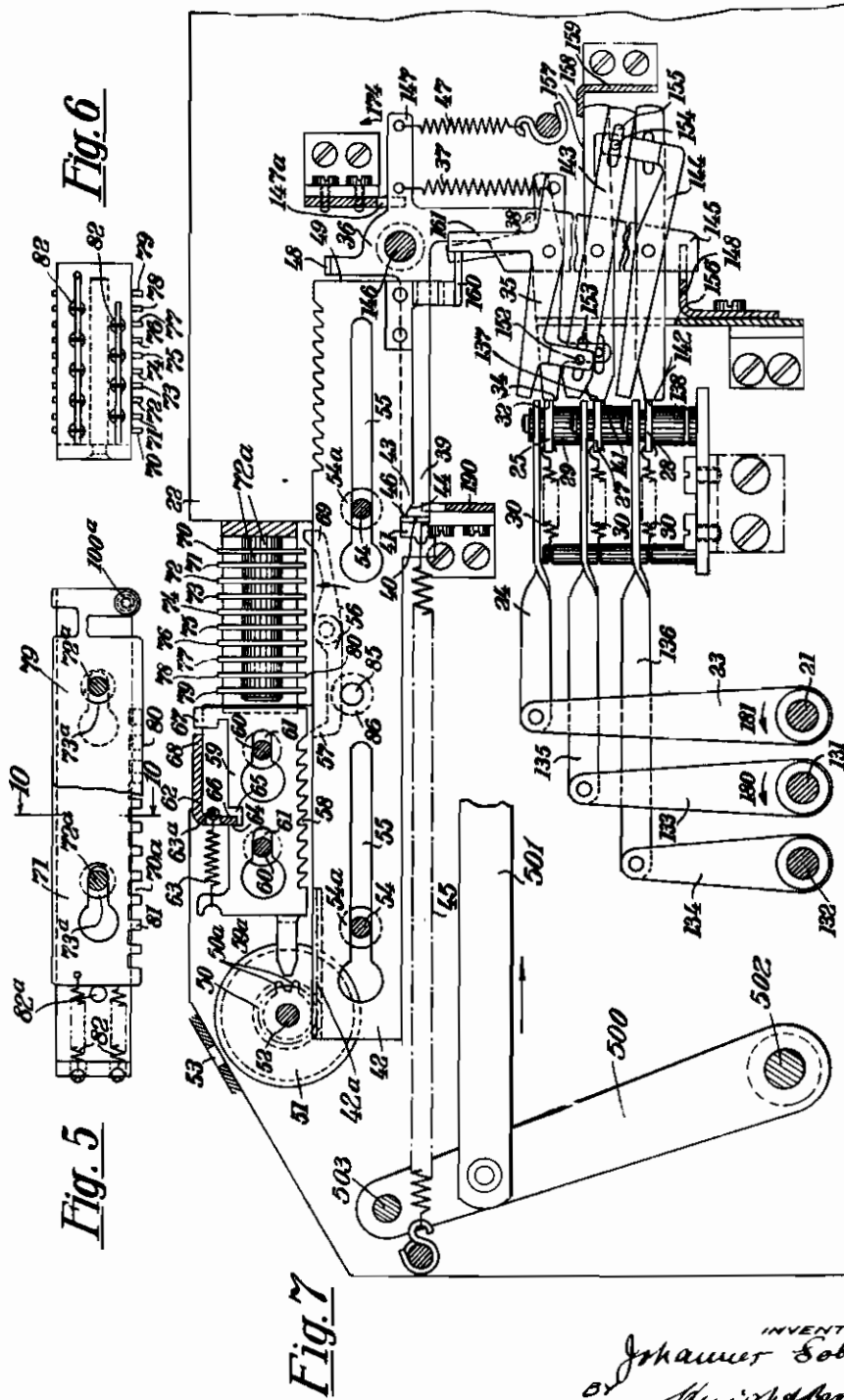
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279,077

7 Sheets—Sheet 4



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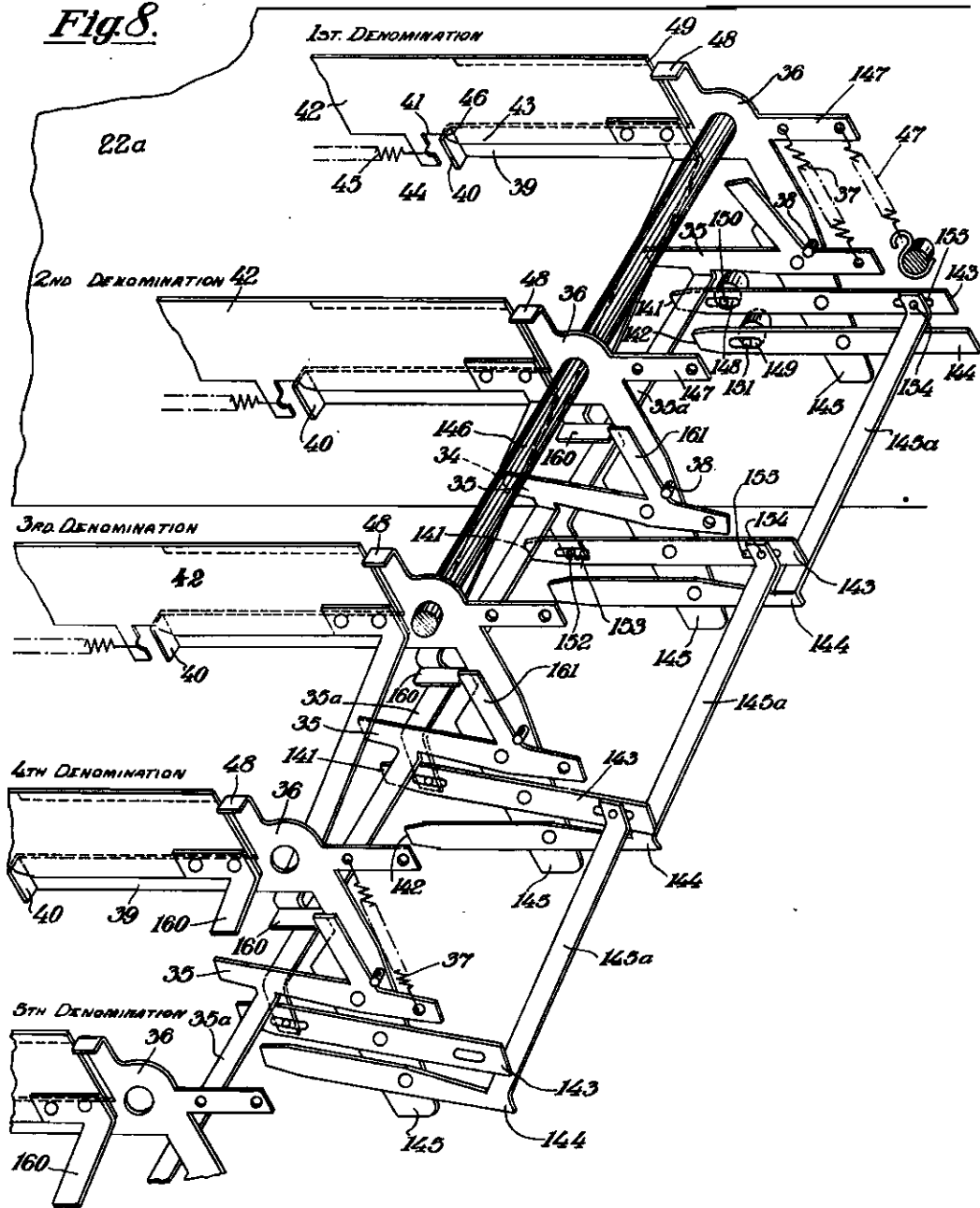
PUBLISHED
MAY 25, 1943.
BY A. P. C.

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279,077

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Fig. 8.



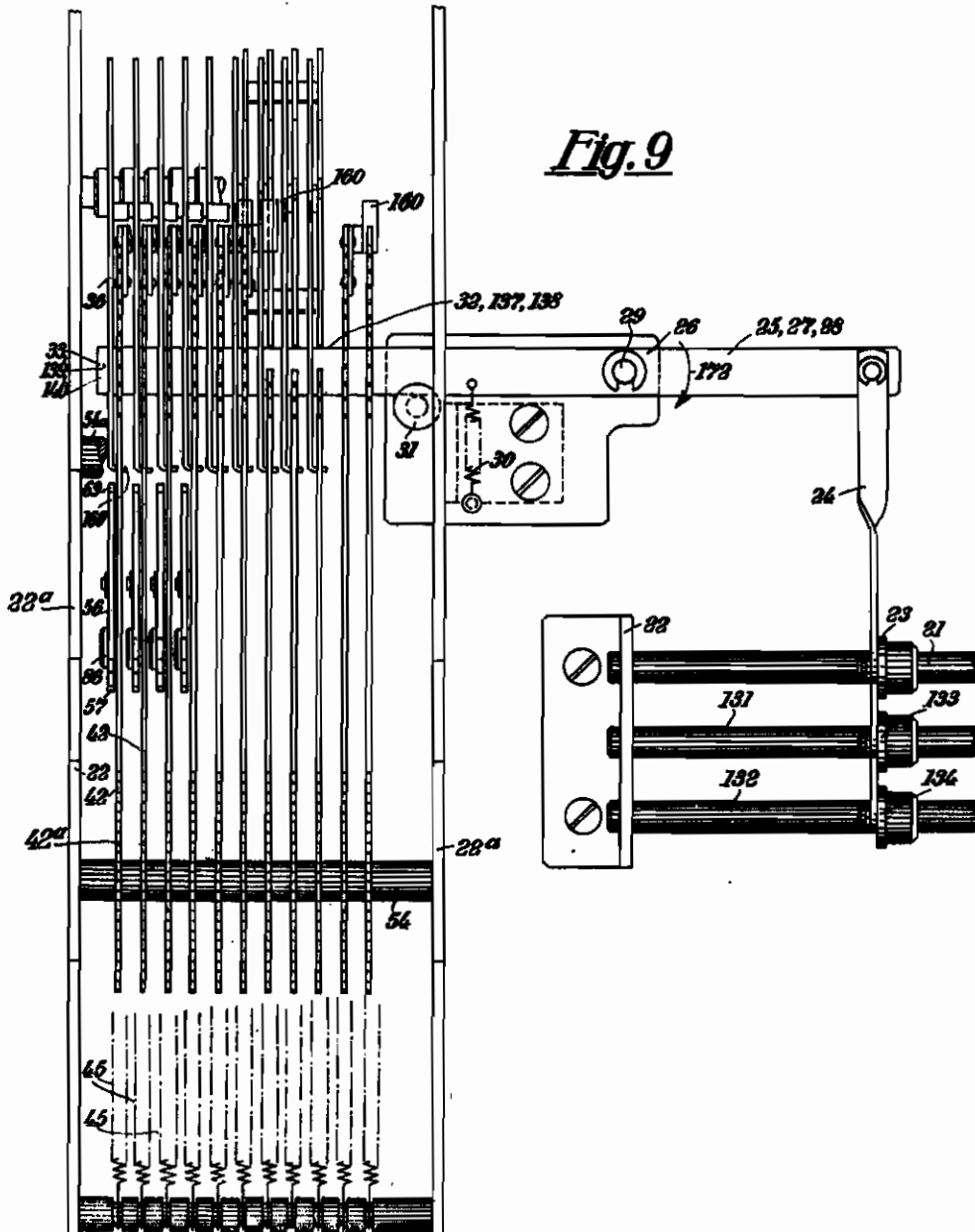
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MAY 25, 1943.
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Serial No.
279,077

7 Sheets—Sheet 6



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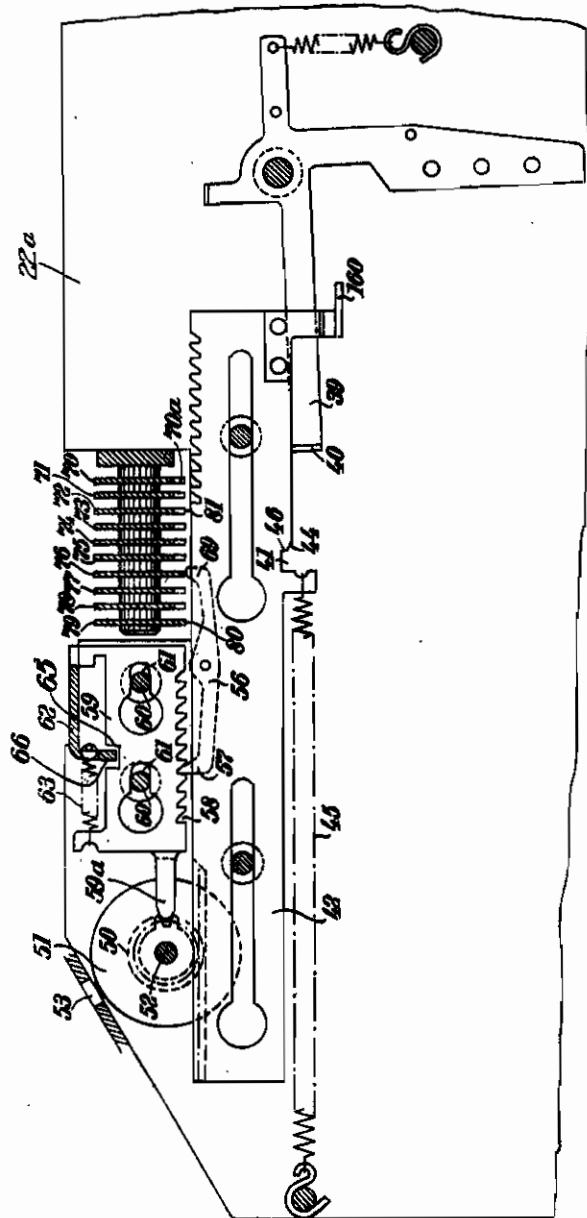
PUBLISHED
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Serial No.
279,077

7 Sheets-Sheet 7

Fig. 10



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ALIEN PROPERTY CUSTODIAN

DECADIC KEYING MECHANISM FOR ACCOUNTING MACHINES OR THE LIKE

Johannes Sobisch, Blefeld, Germany; vested in the Alien Property Custodian

Application filed June 14, 1939

My invention refers to a decadic keying mechanism for counting machines or the like, including a stationery numeral recording or accumulating mechanism which receives the numbers, digit by digit, commencing with the highest (left-hand) digit.

Devices of this kind known from the prior art have the disadvantage that they are not suitable for the simultaneous introduction of several zero digits side by side. With some of the known arrangements it is possible to introduce several zero digits simultaneously into the mechanism, but in those cases it is necessary to arrange the symbol-carrying elements on slides. To apply such methods in counting machines of the type here concerned is not practical, if possible at all.

It is the purpose of the present invention to solve the aforementioned problem in a comparatively simple and effective manner.

The accompanying drawings illustrate a manner in which my invention may be reduced to practice. In these drawings—

Fig. 1 shows in plan view the right-hand side of the keying mechanism.

Fig. 2 shows in plan view the left-hand portion of the mechanism which supplements the right-hand portion of Fig. 1, the connection between the two parts being apparent from the bars 87 common to Figs. 1 and 2.

Fig. 3 represents a left-hand elevation of the keyboard, including its multi-zero keys.

Fig. 4 represents a transverse section through the upper portion of Fig. 3 on the line 4—4 in that figure.

Fig. 5 represents the front view of the control stops for the accumulator or recording elements to be actuated.

Fig. 6 represents a left-hand side elevation of Fig. 5.

Fig. 7 represents a right-hand side elevation of Fig. 2 showing the control mechanisms for the accumulator elements.

Fig. 8 represents an isometric view from above of the right-hand portion of Fig. 7, whereby the operating elements of the several digits are shown moved-apart for clearness sake.

Fig. 9 represents a plan view of the elements shown in Fig. 7, with some of the elements omitted, and

Fig. 10 represents a right-hand side elevation of the upper left-hand portion of Fig. 7 in numeral-indicating position.

Referring to Figs. 1, 3 and 4, the key levers 4, which carry the key heads 8 denoted by the numerals "1" through "9", are journaled on the

round bar 3, the latter being fastened between the side walls 1, 2 of the machine frame. The key levers 4 are prevented from lateral movement by guiding them in the slots 5 of a slotted transverse plate 6 and in a slotted plate 7 arranged at the front of the machine, both plates being disposed between the side walls 1, 2 of the machine frame. To the rear lever end 9 of each key lever 4 a spring 10 is attached, the other end of which is fixed on the machine frame, which springs tend to pull the key levers 4 against the underside of a transverse bridge 11 extending between the two side walls 1, 2 of the machine frame. Each key lever 4 carries a downwardly extending detent 12 (Fig. 3), the inclined portion 13 of which is, in normal position of the key lever, slightly spaced from the round bar 14 which is part of a bail including besides this bar the shanks 15 and 17 (Fig. 1), the latter being pivoted on an axle 16 mounted between the frame portions of the machine. The left-hand shank 17 of this bail is extended beyond its pivoted axis to form an arm 18, carrying at its outer end a pin 19 which engages the forked end of a lever 20 fixed on an axle 21 (Figs. 1, 3, 7 and 9) which is mounted parallel to axle 16 in brackets 22 arranged at the bottom of the machine frame. Near its left-hand journal, axle 21 carries a further lever 23 (Figs. 7 and 9), to the upper end of which is pivotally attached a pull bar 24. The other end of bar 24 is linked to the free end 25 of a lever 26, the latter being horizontally oscillatable on a pivotal stud 29 together with similarly disposed levers 27 and 28 to be referred to later on. Each of these levers, however, is controlled by a spring 30 which tends to pull its lever counterclockwise against the stops 31. In this manner, for instance, lever 25 rests with its edge 32 of its arm portion 33 close to the end 34 of a control rocker 35 when in resting position. As shown in Figs. 7 and 8, for each digit a locking rocker 36, oscillatingly mounted on a common axle 146, is provided and which has a downwardly extending arm 145 to which for each digit the aforementioned type of control rocker 35 is pivotally attached. A spring, attached at one end to the rear end of control rocker 35 and at the other end to the rearwardly pointing end of locking rocker 36, tends to turn control rocker 35 counterclockwise until this rocker abuts against its stop pin 38 provided on the downwardly extending arm 145 of the locking rocker. This conditions prevails in the resting position of the mechanism only with respect to control

rocker 35 appertaining to the extreme left-hand noted from Fig. 8.

Each locking rocker 36 also carries a forwardly extending arm 39 (Figs. 7 and 8) which is guided in a notched plate 190 of the machine frame and engages, with its bent end 40, the recess 41 of the horizontal rack bar 42 appertaining to that digit. The right-hand side of recess 41 has only a small abutment edge 46, which rises as shown at 44 into an elongated cam 43. Each rack bar 42, of which there are provided as many as there are digits available in the machine, is individually influenced by a spring 45 which tends to pull it forward (Fig. 7), so that it will abut with its stop 46 aforementioned against the bent end 40 of arm 39. A spring 47 tends to turn locking rocker 36 clockwise on its pivotal axis 146 so that the detent portion 40 of its arm 39 is normally held in recess 41 and against its stop 46. Each locking rocker 36 is further provided with an upwardly extending arm which has its end 48 bent at right angles to the plane of the rocker so that when arm 36 is in normal resting position, it is spaced a slight distance from the rear end 49 of appertaining rack bar 42, as is clearly shown in Fig. 7. The front portion (left-hand portion in Fig. 7) of each rack bar 42 is provided at its upper edge for a short distance with rack teeth which mesh with the pinion 50 of the appertaining symbol disc 51 which carries the numeral symbols "0" to "9" on its periphery. These numeral symbols are individually visible to the observer through the window 53 provided on the front cover of the machine, as is shown in Fig. 7. Each rack bar has its individual pinion and numeral disc, and all discs and pinions are journaled on an axle 52 fixed between the side walls 22^a, 22^a of the machine frame, as is clearly shown in Fig. 2. The several numeral discs, as is also shown in this figure, are sufficiently spaced apart to permit certain elements, to be referred to hereinafter, to enter between adjacent numeral discs and engage respectively the pinions of the discs. The arrangement is such that each numeral disc, when in resting or normal position, shows in the window 53 an idle symbol, such as for instance a red mark. The rack bars for all the digits are guided by means of slots 55 which engage a common guide bar 54 provided with a groove 54^a for each rack bar. These two guide bars are mounted between the side walls 22^a of the machine frame, as shown for the front guide bar in Fig. 9. Each rack bar carries a double-armed pawl 56 pivotally attached to it intermediate the ends of the bar. The pawl is spring-controlled (not shown), tending to turn counter-clockwise and normally resting against a stop pin 65 provided on the rack bar. The stopping tooth 57 of the pawl is disposed to engage the ratchet teeth 58 provided in the lower edge of a stop slide 59, one slide appertaining to each rack bar 42. The ratchet teeth 58 are arranged in their order from the front to the rear of the machine so that they are respectively assigned to the numeral symbols "0" (near the first end) followed by "9" to "1." Each slide 59 is longitudinally slidingly disposed on transverse bars 60 in a manner similar to that explained with respect to the mounting of the rack bars 42 so that each slide runs parallel to its rack bar 42 and can move slightly in the same direction as the latter. Each slide 59 is spring-controlled by means of a spring 63 attached at one end to the front of the slide and at the other end to a common transverse bar 63^a which rests within a

transverse angular bracket 62. This bracket extends with its shank 66 downwardly into a recess 65 of each slide, so that when the appertaining spring 63 comes into effect, the slide is pulled with its recess edge 64 against the shank 66 of bracket 62. Each slide 59 is further provided at its rear end with a stop 67 which stands in line with the rear edge 68 of the horizontal shank of bracket 62, so that when the slide is moved forward in the machine a given distance, stop 67 will abut against the bracket edge 66 and thus limit the forward motion of slide 59 against the tension of its spring 63. Lastly, each slide 59 carries at its forward end a spur 59^a which is of such a length and disposed in such a manner that when its appertaining slide 59 is moved into its extreme forward position, the end of spur 59^a engages between two adjacent teeth such as 50^a of pinion 50, thereby positioning this pinion so long as slide 59 remains in its extreme forward position. The rear position (right hand portion in Fig. 7) of each rack bar 42 is provided at its upper edge for a short distance with ratchet teeth, which are disposed to engage calculating or other transferring means not shown here.

The rearwardly pointing tooth 69 of double pawl 56 extends normally beyond the upper edge of its rack bar 42, as shown in Fig. 7. Transversely of all rack bars 42 are arranged a group of plates 70 through 79, which are shown in front elevation in Fig. 5. One plate is assigned to each of the numeral symbols "0" to "9." The plates, as shown in Fig. 7, are spaced one from the other and are slidingly mounted on common rods 72^a provided with circumferential grooves 73^a, one for each slide. This clearly appears from Figs. 2, 5 and 7. Each of plates 70 to 78 is provided on its lower edge with teeth 81 forming interstitial spaces 70^a between the teeth of sufficient width for pawl tooth 69 to slide through it. The number of teeth and interstitial spaces is equal to the number of rack bars 42 provided. Ahead of slides 70 to 78 is mounted a stop plate 79, which is not movable on supporting rods 72^a, and the lower edge of which is not serrated but flush with the lower edge of teeth 81 of slides 70 to 78, as clearly shown in Fig. 5. In other words, the lower edge 80 of stop plate 79 covers transversely of bars 42 all teeth and interstitial spaces of the slides. Each transverse slide is pulled by an individual spring 82 until its right-hand end portion (see Fig. 5) abuts against a stop pin 82^a common to all slides. The stop plate 79 aforementioned serves as a control means for the recording of a "0" in a manner to be described later. Sliding plates 70 through 78 and stop plate 79 are spaced apart in such manner that the total sum of their spacings, and including the distance of nose 69 of pawl 56 from the first sliding plate 70, corresponds with the sum of the ten steps which the rack bar 42 can perform by virtue of the ten ratchet teeth 58 provided in the afore-described slides 59.

As shown more clearly in Figs. 5 and 2, sliding plates 70 to 78 are connected by means of individual pull bars 87 with a corresponding number of individual coupling elements 87^a, shown in Figs. 1 through 4. As shown in these figures, these coupling elements are individually mounted on two vertical parallel rocking levers 97 and 96, pivotally supported on studs 99 attached to the lower end of a transverse plate 6. This is clearly shown in Figs. 3 and 4. Levers 87, 96 of each coupling element engage these aforementioned studs with their forked ends, so that these cou-

pling elements can swing in the direction of arrow 170 in Fig. 4. Each pull bar 87 aforementioned engages, with its notched end 83, the pin 100 of its respective coupling plate 87^a, and at its other end each bar engages in similar manner respectively the pin 100^a of the corresponding transverse slide plates 70 to 78, as shown in Fig. 2. Each of the coupling plates 87^a is provided with an upwardly extending detent. These detents are denoted by 88 through 96 in Figs. 3 and 4, and each detent is disposed transversely of the machine at a different place, as shown in Fig. 4, so that each detent of a plate 87^a is alined with one of the key bars 4, which are shown in Fig. 4 in cross section. Detents 88 through 96 are respectively provided with inclined edges 101 through 109, which are located in line with the slots 5 of transverse plate 8 in which the key bars 4 are guided, so that these inclined edges become located in the path of the key bars when the latter are depressed. Thus, if a key bar is depressed it engages the inclined edge of its appertaining detent and thereby moves the appertaining coupling plate 87 to the right in Fig. 4. This motion is transmitted through the corresponding pull bar 87 to its slide plate of the group 70 through 78 in Fig. 2.

Transverse supporting plate 6, as shown in Figs. 3 and 4, is further provided in its lower central portion with three slots 110, 111 and 112 in which the key bars 113 through 115, which carry the keying heads 118 through 120 respectively, are guided. These key bars are located underneath the keys 1 through 9, but extend further toward the operator, as shown in Figs. 1, 3 and 4, and carry the designations "0", "00" and "000" respectively. Key bars 113 through 115 are pivoted on a common axle 116 and controlled by individual springs 117, as shown for one bar in Fig. 3, so that these key bars will normally rest against the tops of their respective slots 110 through 112 in Fig. 4. Key bar 113, as shown in Fig. 3, carries an upwardly extending detent 121 which extends with its inclined edge 122 over the previously mentioned transverse bar 14 of bail 15, 17, so that when key bar 113 is depressed it will actuate the bail in the same manner in which it is actuated by each of the key bars 1 through 9 aforementioned. Key bars 114 and 115 each carry a downwardly extending detent 123, 124, each of which is provided with an inclined edge 125, 126 respectively. These inclined edges, on depression of the aforementioned keys, bear against pins 127, 128 respectively of levers 129, 130 which are fixed on axles 131 and 132 journaled in frame 22, as shown in Figs. 3 and 7. In this manner, for instance, when key bar 111 is depressed, the inclined edge 125 of its detent 123 engages pin 127 and thus rocks the appertaining lever 129 and its axle 131 counterclockwise. The same action occurs with respect to lever 130 when key bar 112 is depressed. As shown in Figs. 7 and 9, on axles 131 and 132 are fixed, respectively, upwardly extending levers 133 and 134 which are each connected respectively by a push bar 135, 136 to the previously mentioned levers 27 and 28 pivotally mounted together with the lever 26, also previously mentioned, on the common vertical pivotal stud 29. In Fig. 9, all three levers pivoted on stud 29 are shown in line, and therefore only top lever 26 is visible. In Fig. 9 there are therefore shown three reference numerals 25, 27, 28 at the right-hand side of pivot 29, and three numerals 33, 139, 140 at the left of Fig. 9, indicating that there are three double-armed levers in line, one

underneath the other. Levers 27 and 28, as shown in Fig. 7, are spaced vertically so that they can abut with their edges 137, 138 respectively of their arm portions 139, 140 (see also Fig. 9) against the ends 141, 142 of rockers 143, 144 respectively when these ends are moved into the path of the levers. A pair 141, 142 of these rockers is assigned to each locking rocker 36 and pivotally attached together with the appertaining control rockers 35 aforementioned to the downwardly extending arm 145 of the locking rocker 36. As shown in Figs. 7 and 8, the locking rocker 36 for each of the digits carries attached to its arm 145 a control rocker 35 and a rocker 143 and 144, the latter as aforementioned being operable respectively by the levers 27 and 28. The several arms 33, 145 and 147 of each locking rocker 36 are guided respectively in the fixed slotted plates 130, 148 and 147^a, so as to prevent lateral movements of these rockers. Rockers 143 and 144 of the highest digit are provided with elongated holes 148, 149 respectively, through which they are guided by means of pins 150, 151 fixed on the side wall 22^a of the machine. Thus the oscillation of these two last-named rockers on their pivots on arm 145 depends in the first digit only upon the rocking motion of the appertaining locking rocker 36, and they are not influenced by any of the control rockers 35 of the system. Control rocker 35 and rockers 143 and 144 of the highest digit, therefore, always rest with their end surfaces 34, 141, 142 (Fig. 7) close to the edges 32, 137, 138 of levers 25, 27, 28 respectively, ready for operation by the latter.

As shown in Fig. 8, control rocker 35 of each digit is coupled to the rocker 143 of the next lower digit by means of a bar 35^a and a pin and slot connection 152, 153. Also, the rear end of each rocker 143 is pivotally coupled to the rear end of the rocker 144 of the next lower digit by means of a pin and slot connection 154, 155 and coupling bar 145^a. In normal or resting position of the machine, we thus have a relative position of the different operating elements, in which the elements 35, 143, 144 of the highest digit are always ready for immediate operation as soon as the respective levers 25, 27, 28 are actuated in the manner described hereinbefore, and further the rockers 143, 145 of the next lower and the rocker 144 of the second next lower digit are similarly in operative position in front of the edges 137, 138 of their respective common levers 27, 28. The forwardly extending arms of the rockers 35, 143, 144 of all digits are laterally guided in a slotted fixed transverse guide 156, shown in Fig. 7. The rearwardly pointing arms of all rockers 143, with the exception of the rocker 143 of the first digit, abut in their operating position with their upper edge 157 against the inside of shank 158 of a fixed angle plate 159 arranged transversely to the rockers in the machine frame. In Fig. 7, the control rocker 35 of the first digit, the rockers 143 of the first and second digits, and the rockers 144 of the first, second and third digits are shown in position ready for operation with their appertaining levers 25, 27 and 28, while the rocker 143 of the third digit is shown in inoperative position with respect to its actuating lever 27. Each rack bar 42 carries at its rear end a locking detent 160 (Figs. 7 and 8) which extends from the rack bar of each digit to and in front of the control rocker 35 of the next lower digit, which rocker it engages by means of the upwardly extending arm 161 of that rocker. In this manner, each rack bar 42, when in normal inoperative

position as shown in Figs. 7 and 8, thereby lifts the control rocker 35 of the next lower digit clockwise against the tension of the spring 37 of the latter, so that this rocker is placed into the position shown in full lines in Fig. 7 and such as is shown in Fig. 8 with respect to the second, third and fourth digits. Control rocker 35 of the first or highest available digit has no such lifting means and should always remain in the position shown in Fig. 8 and shown in dotted lines in Fig. 7, namely, with its end 34 directly in front of its appertaining operating lever 25. All other lower digit control rockers, however, are lifted out of the range of operating lever 25, and cannot be actuated when the latter is operated to record a desired numeral in the first digit in window 53 of the accumulator.

It will further clearly appear from Fig. 8 that as soon as the rack bar 42 of the first digit has been moved to the left to produce a numeral record, its locking detent 160 is removed from the arm 161 of the control rocker 35 of the next lower digit so that this control rocker, under the tension of its controlling spring, moves counterclockwise into a position in which its left-hand arm comes within operating range of operating lever 25 in Fig. 7, so that if this lever is operated again by depressing either the same key again, or any other key, this second control rocker is actuated by lever 25. Also, as soon as the control rocker 35 of the second digit has swung counterclockwise as just described, its arm 35^a, which is coupled with the rocker 143 of the third digit, moves this latter rocker down and brings the front edge 141 of this rocker within operating range of lever 27 (Fig. 7) so that if the "00" key is depressed in the second digit, the locking rocker 36 of the third digit is actuated at the same time and thereby releases simultaneously the third digit rack bar 42 to simultaneously record in the accumulator a "0" symbol in the second and third digits.

The operation of the entire mechanism is as follows.

If it is desired, for instance, to first record the numeral "7" as the first digit of a given numeric value, the key bar 4 in Fig. 1, corresponding to the numeral "7", is depressed. Thereby the key bar 4 strikes (see Figs. 1 and 4) the inclined edge 107 of detent 94 of the appertaining coupling bar 87^a and shifts this bar to the right in the direction of the arrow 170 in Fig. 4, thereby operating the appertaining pull bar 87 and (Fig. 2) the corresponding slide 75 (see also Fig. 10) so that this latter slide moves to the right in Fig. 5 whereby its teeth 81 moves in line with the interstitial spaces 70^a of the remaining slides, it being assumed that in normal position all slides are positioned so that their respective teeth and interstitial spaces are in alignment. Thus the tooth 81 of the seventh slide moves into the path of nose 69 of double pawl 56 attached to the first digit rack bar 42, and therefore the clear path for nose 69 through the appertaining interstitial spaces of all slides is interrupted at the seventh slide. At the same time, when the aforementioned key bar 4, denoting numeral "7", is depressed (Fig. 3), its inclined edge 13 of detent 12 engages the bar 14 of ball 15 and swings the latter in the direction of the arrow 171 in Fig. 3. Thereby, through the pin and fork coupling aforesaid, levers 20 and 23 (Figs. 3, 7, 9) partake in this rocking motion in clockwise direction. Thereby lever 25 is rocked in Fig. 9 in the direction of the arrow 172, whereby edge 32 of its opposite arm 33 engages the end 34 of

control rocker 35 of the first digit, which as described before is always in ready-operating position and shifts this lever bodily to the right, thereby rocking its locking rocker 36 counterclockwise so that the arm 39 of the latter becomes disengaged from the recess 41 of the first digit rack bar 42, allowing the latter to be thrown to the left in Fig. 7 through the action of its spring 45. In order that the end 40 of rocker arm 39 is sure to be entirely removed from recess 41, even in case the key should be only very lightly depressed, the inclined cam surface 44 is provided at the rear edge recess 41, by which inclined surface the arm 39 is thrown entirely clear of bar 42 and slides along the lower edge 43 of rack bar 42 when the latter is thrown to the left. This will rock locking rocker 35 sufficiently to operate the remaining elements 35, 143, 144 with which it is connected. Of course, with a normal fairly strong touch of the keys by the operator, this precaution does not come into effect so gradually, because then arm 39 will fly out at once sufficiently far by itself. If thus rack bar 42 of the first digit, for which the numeral "7" had been keyed, flies to the left, the nose 69 of its double pawl 56 travels (see Fig. 10) clear through all appertaining interstitial spaces of sliding plates 70 through 75, but it engages a tooth 81 of plate 76 which, as described hereinbefore, had been moved into its path when the key for numeral "7" was depressed. Thereby double pawl 56 is rocked suddenly clockwise and its tooth 57 at the other end at that moment engages the ratchet tooth 58 which corresponds with the seventh position of the ratchet toothing of slide 59. Thereby rack bar 42 is stopped in its path, but while travelling the distance up to the seventh tooth has turned pinion 50 and thus its numeral disc 51 sufficiently to show numeral "7" in window 53. When tooth 57 of double pawl 56 thus engages slide 59 and is stopped by the latter, its momentum throws this slide 59 a short distance to the left against the tension of its spring 63, sufficiently to cause spur 59^a to enter between two teeth of pinion 50, thereby positively setting the latter in a position in which its appertaining numeral disc shows the numeral "7", and preventing it from being overthrown. While slide 59 is thus moved a very short distance forward to the left within the limits determined by its stop detent 67, its spring 63 is tensioned and thus acts as a cushion for the stopping of rack bar 42 and lessens the impact of stop 67 against edge 68 of angle bar 62. Fig. 10 shows the rack bar 42 adjusted to show numeral "7" in window 53, while Fig. 7 shows the rack bar still in normal, retracted position.

When locking rocker 36 of the first digit is moved counterclockwise by the operation of the mechanism just described, so that its lower arm 145 moves rearwardly, its rockers 143, 144 partake in this rearward motion in Fig. 8, without thereby producing any effect on account of the slot and pin connection 154, 155 at 143. When rack bar 42 of the first digit has moved forward to record the desired numeral "7" in the first digit, the locking detent 160 attached to this rack bar and extending over to the control rocker 35 of the second digit is moved out of the way of arm 161 of the latter rocker. Thereby this control rocker 35 under the tension of its appertaining spring 37 is moved counterclockwise, and thereby its forward end 34 in Figs. 7 and 8 is moved in front of the edge 32 of lever 26 into ready operating position, so that when lever 25 is actuated with the depression of the next key, this control

rocker of the second digit will be encountered and release the locking rocker 36 of the second digit. When this control rocker 35 is thus released and turns counterclockwise, the rocker 143 of the third digit, which is coupled with control rocker 35 of the second digit by means of bar 35^a as described, partakes in this counterclockwise motion, and likewise the rocker 144 of the third digit, which as described before is coupled by means of bar 145^a with rocker 143 of the second digit, whereby also the front edge 141 of rocker 143 of the second digit and the front edge 142 of rocker 144 of the third digit are placed within operating range of their respective levers 27, 28 in Fig. 7, ready to be acted upon by these levers in case they are operated. Thus the rocking motions of certain of these elements of one digit, as described, are propagated to certain desired elements of the next and second next lower digits. In Fig. 8, this propagation is shown as extending only over the first three digits, assuming that the largest number of "0" symbols that may be simultaneously keyed is "000."

If now in Fig. 1 the key 118, representing a single "0," is depressed, its key lever 113 engages with its inclined detent 122 in Fig. 3, the bail bar 14 and rocks it in the direction of the arrow 171, and thus the second rack bar 42 is released in the same manner by way of levers 20, 23, 24, 25 in Figs. 7 and 8, as has been described with respect to the recording of the numeral "7" of the first digit, the bar 42 of this first digit still remaining in released position (Fig. 10) in which its locking bar 160 in Fig. 8 has released the control rocker 35 of the second digit so that it is in ready operating position to actuate the locking rocker 36 of the second digit as soon as the "0" key for the second digit is depressed. When this occurs, the bar 42 of the second digit will be thrown forward, and since in keying a single "0" none of the serrated sliding plates 70 through 78 in Fig. 7 had been transversely moved, the teeth and interstitial spaces of all of these plates remain respectively in alignment and the nose 69 of double pawl 56 has a clear path to slide through all interstitial spaces until it abuts against plate 79, which as described before and as is shown in Fig. 5 has no teeth and interstitial spaces and is fixed. Therefore, the rack bar 42 can advance unhindered to the left in Fig. 7, and thereby the pinion 50 of the second digit is turned sufficiently far so that its numeral disc 51 will show a zero in the window 53 when nose 69 of pawl 56 engages zero plate 79 and moves its pawl clockwise. Therefore, at this moment tooth 57 of pawl 56 engages the last left-hand tooth of the ratchet 58 and thereby throws slide 59 to the left until its spur 59^a engages between two teeth 50^a of pinion 50 of the second digit numeral disc, thereby locking it in "0" indicating position, the same as was described with respect to the indication of numeral "7" in the first digit.

When control rocker 35 of the second digit in Fig. 8 is thus actuated, rocker 143 of the third digit has already been moved into ready operating position by bar coupling 35^a between the second and third digits due to the actuation of the rack bar 42 of the preceding (first) digit which allowed control rocker 35 of the second digit to swing into operative position. Therefore, if in place of a single "0" in the second digit, the operator desires to introduce "00" into

the machine simultaneously, one "0" in the second digit and the other "0" in the third digit, he would depress, instead of the "0" key 118, the "00" key 119 in Figs. 1 and 3. In that case, the inclined surface 125 of detent 123 attached to the key bar 114 of that key actuates the pin 127 of lever 129. This causes levers 129 and 133 (Figs. 7, 9, 3) to rock in the direction of the arrow. Lever 133 through its pull bar 135 actuates horizontal lever 27 in the direction of the arrow 172 in Fig. 9, which brings the edge 137 of this lever into engagement with the end surfaces 141 of rockers 143 of the second and third digits, which have been brought into its operating range in the manner aforesaid. Thereby not only locking rocker 36 of the second but also that of the third digit is actuated simultaneously, and the rack bars 42 of both digits are released and fly to the left under their spring pull. The double pawls 56 of both rack bars find the path through all sliding plates 70 through 78 clear until their noses 69 abut against the common fixed zero plate 79 in Fig. 7. Thus the second and third digit pinions 50 and the appertaining numeral wheels 51 are turned simultaneously far enough to show a "0" in window 53 at the same time for the second and third digits. Thus after a "7" had been indicated in the first digit, "00" are indicated in the second and third digits. When the third digit rack bar 42 moves forward, its locking bar 160 in Fig. 8 releases control rocker 35 of the fourth digit and allows it to move in ready operating position so that the operator can now press the key for any desired single numeral value to appear in the fourth digit in the window 53. Accordingly, the elements 35, 143, 144 of the fourth, fifth and sixth digits now assume the positions which were assumed by the corresponding elements for the first, second and third digits before the "00" recording described hereinbefore had occurred.

Further, if instead of "00" the operator desires after keying the first digit to simultaneously key "000" for the second, third and fourth digits, he depresses, instead of the "00" key, the "000" key, this causes the fourth digit rack bar 42 now also to be simultaneously thrown forward together with the second and third digit bars, and thus "000" will simultaneously appear in window 53 in the same manner as described before, because in this case, by depression of key 120 in Fig. 1, the key bar 115 has also actuated, by way of levers 130, 134 and bar 136, the lever 28 together with levers 25 and 27, and thereby engaged the front end of rocker 144 of the fourth digit by which the locking rocker 36 of that digit is moved to release its rack bar 42 to allow it to advance to "0" indicating position. Rocker 144 of the fourth digit is within operating range of lever 28 because, as will be noted, the rear end of this lever is coupled by its bar 145^a to the rear end of rocker 143 of the third digit, and the front end of that rocker is coupled by its coupling bar 35^a to control rocker 35 of the second digit. The latter rocker, having been released into operating position by the actuation of rack bar 42 of the first digit, thus lowers rocker 143 of the third digit and rocker 144 of the fourth digit into operating position. If this arrangement is extended sufficiently far beyond what is shown in Fig. 8, it is of course possible to simultaneously indicate even more than "000" by depressing an additional key or keys which would have to be provided on the keyboard in

Fig. 1 with the necessary additional lever systems such as 130 and 134 in Figs. 3 and 7.

After the desired numeric value has thus been recorded in the window 53, all operated rack bars 42 can be returned to normal position by means of a releasing bar 503 (Fig. 7) attached to a rocker 500, conventional means not shown here, so that the locking rocker 36 of each bar causes

its arm 39 to reengage the recess 41 of its appertaining bar and hold the latter in normal position shown in Fig. 7. This reengagement also returns all rockers connected with rocker 35 to normal position. The rocker 500 is pivotally mounted to an arm 501 projecting from the driving shaft 502 of the machine.

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