

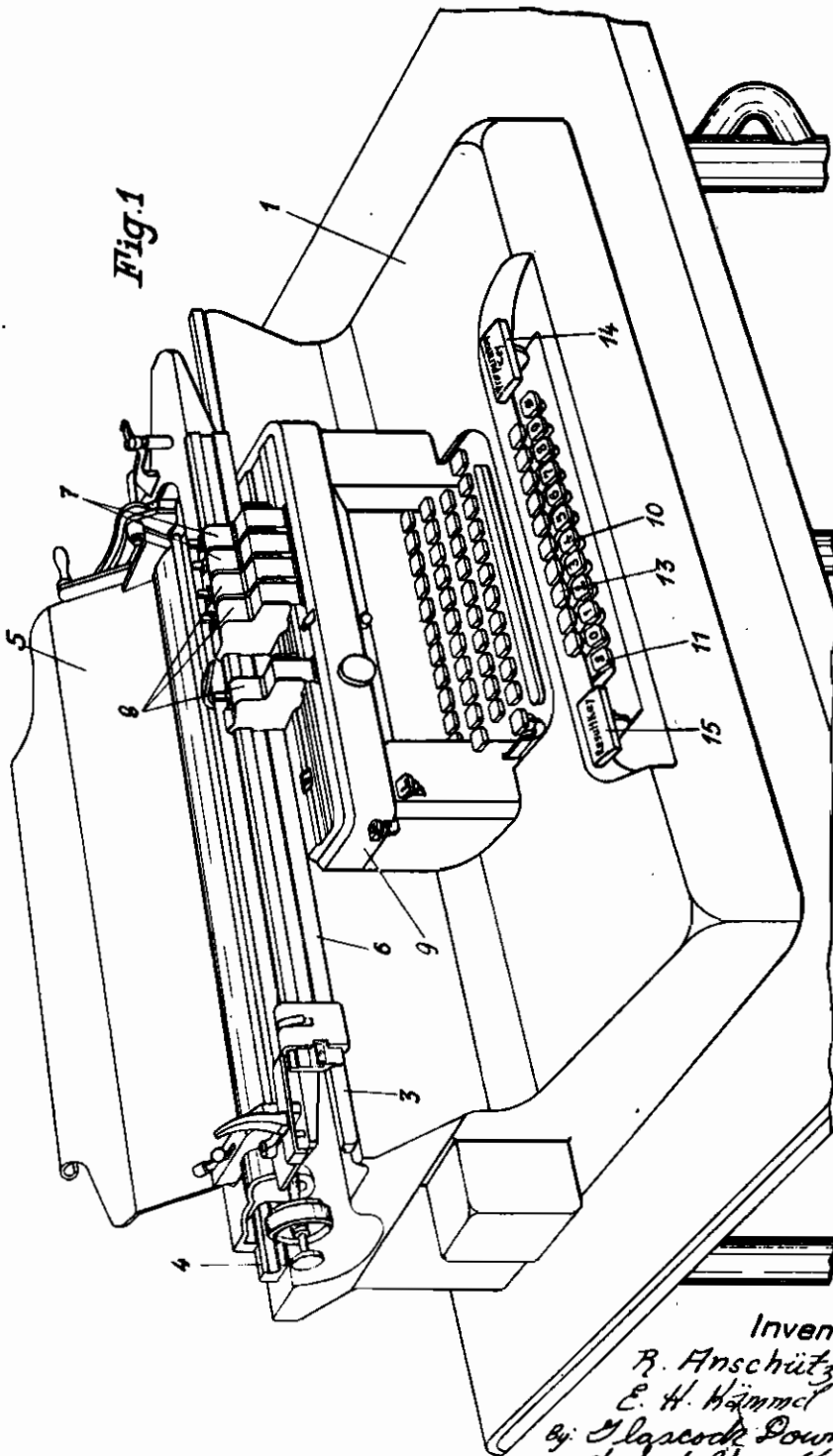
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R. ANSCHÜTZ ET AL
BOOKING MACHINE, PARTICULARLY
TYPEWRITING-CALCULATING
MACHINE, EQUIPPED WITH
TOTAL-TAKING MECHANISM
Filed May 31, 1940

Serial No.

338,272

22 Sheets-Sheet 1



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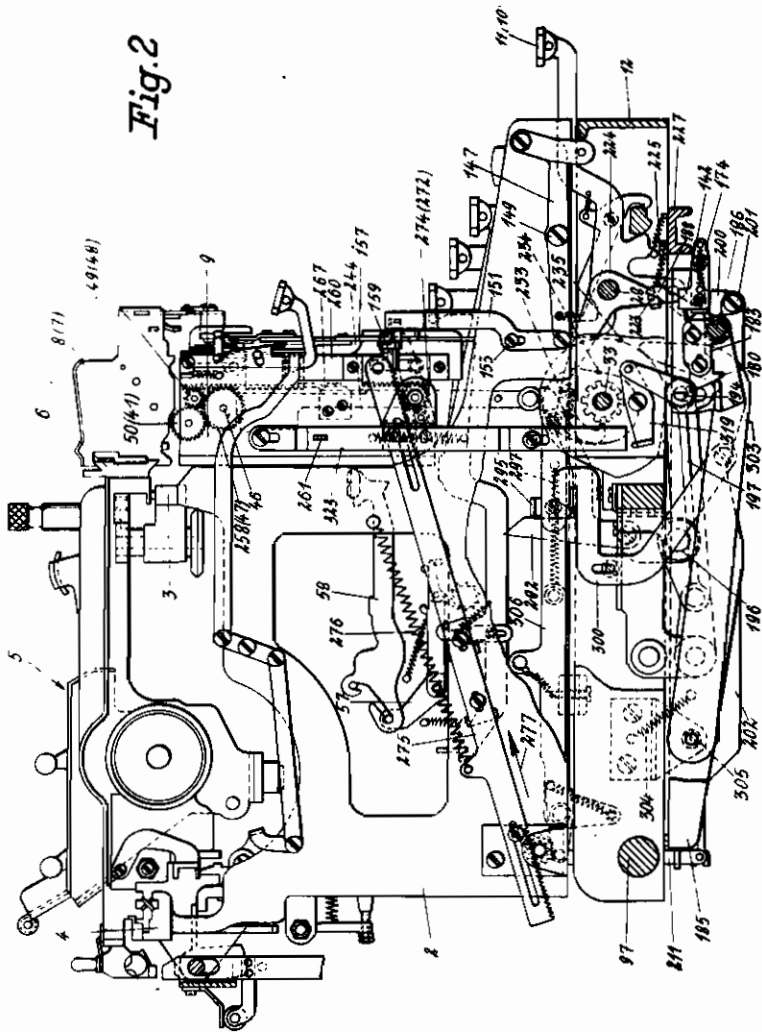


Fig. 2

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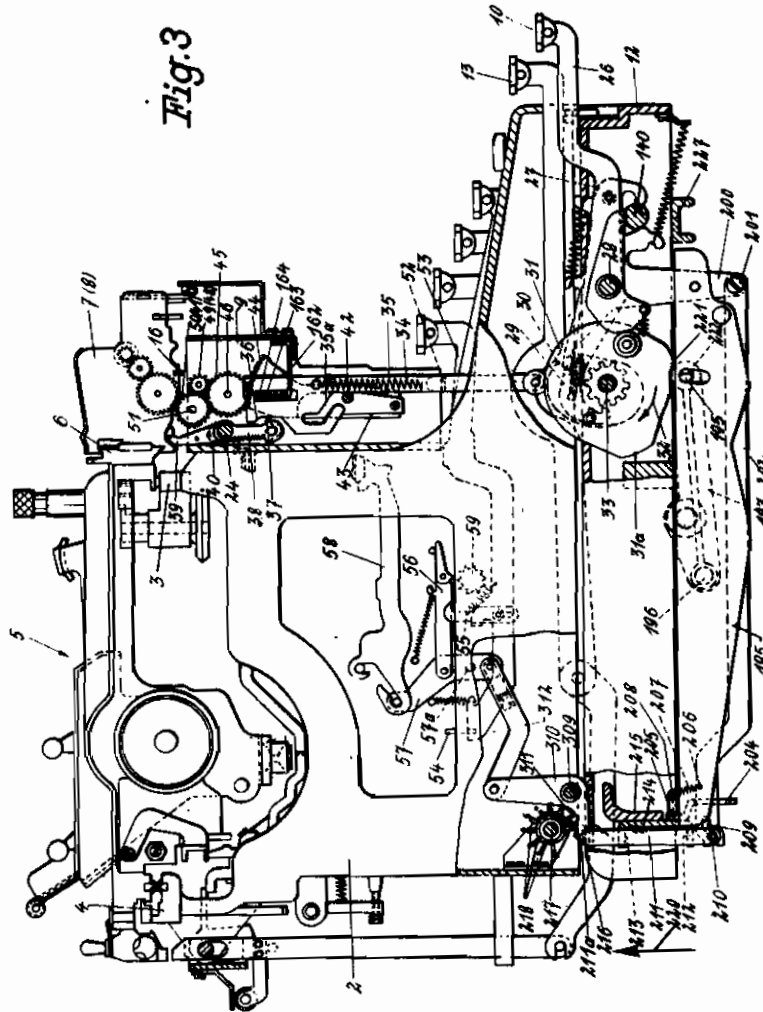


Fig. 3

Inventors,
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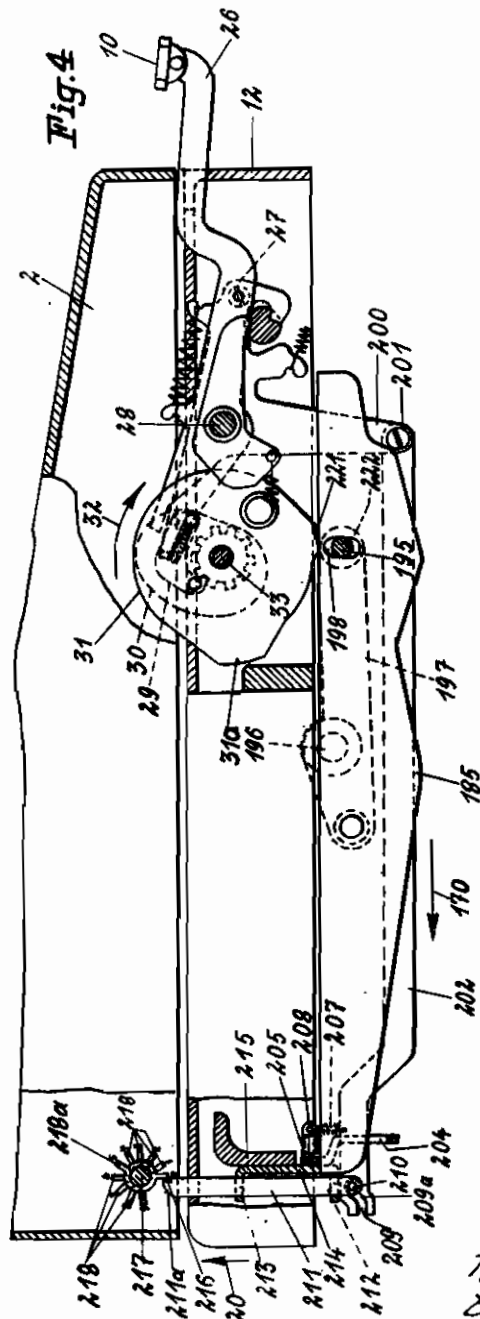
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22 Sheets-Sheet 4



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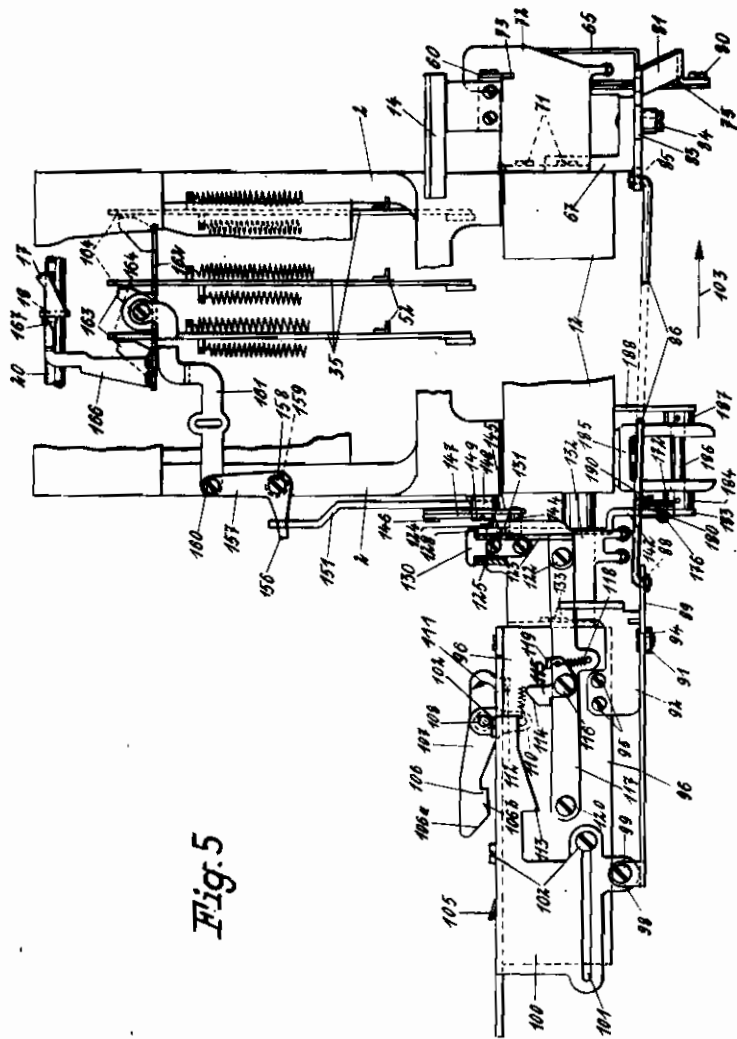


Fig. 5

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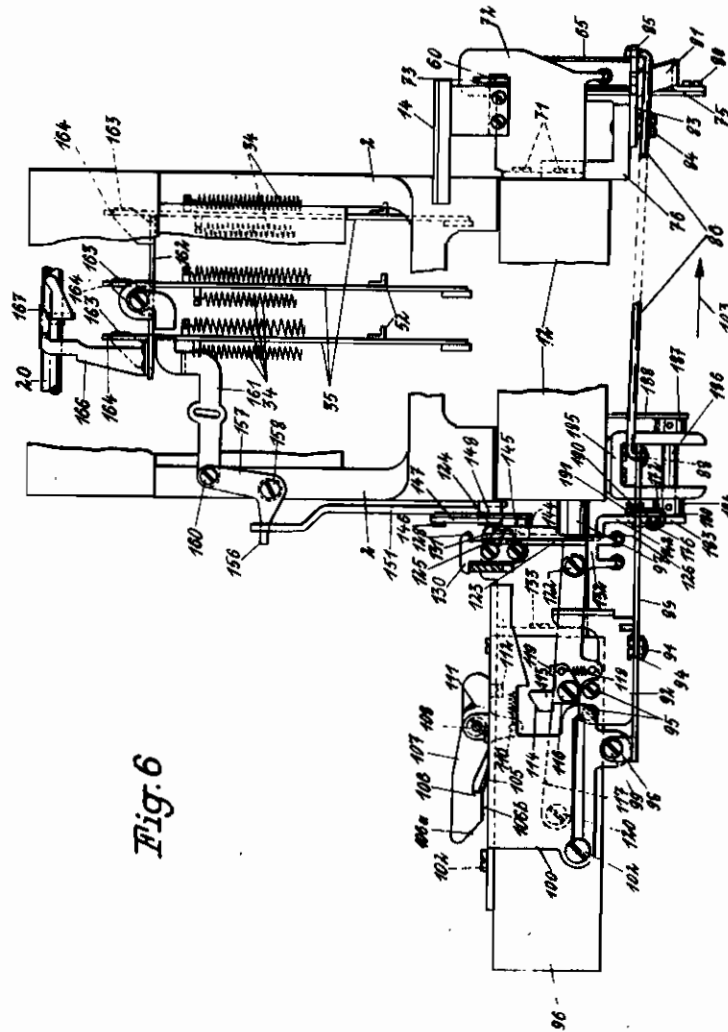


Fig. 6

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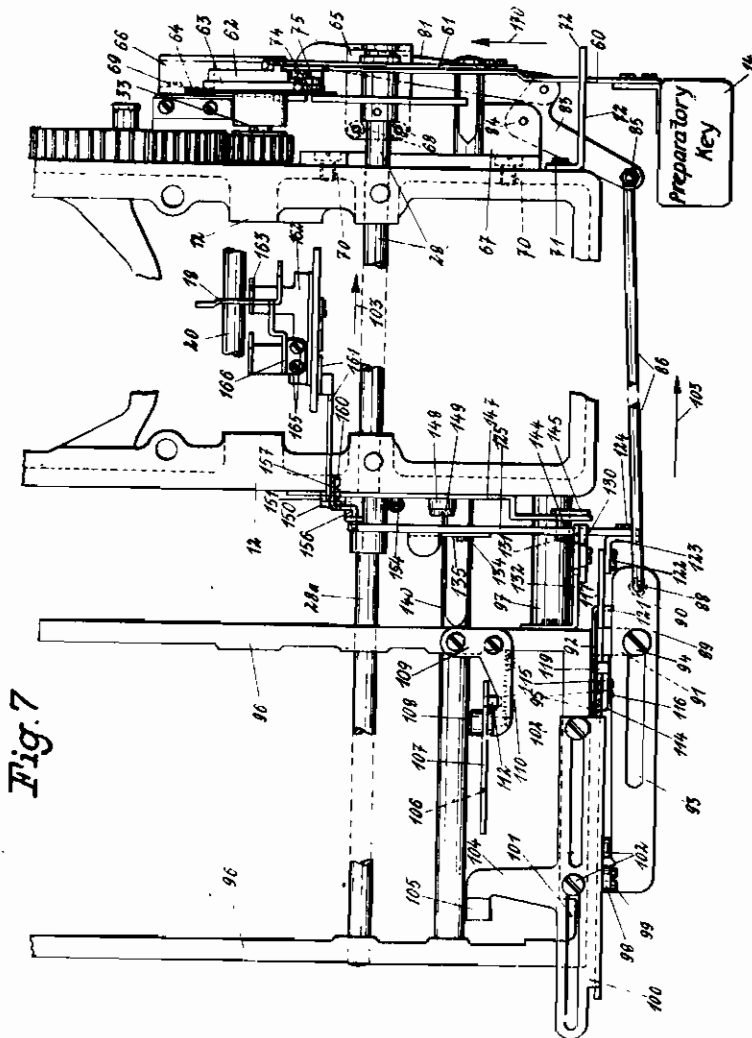


Fig. 7

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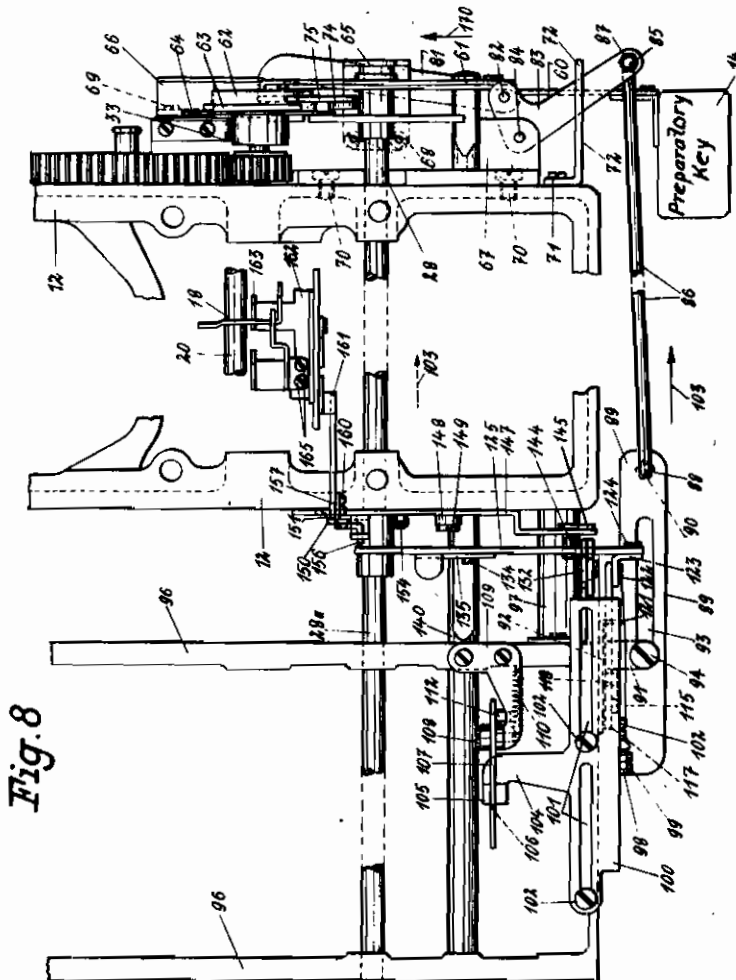


Fig. 8

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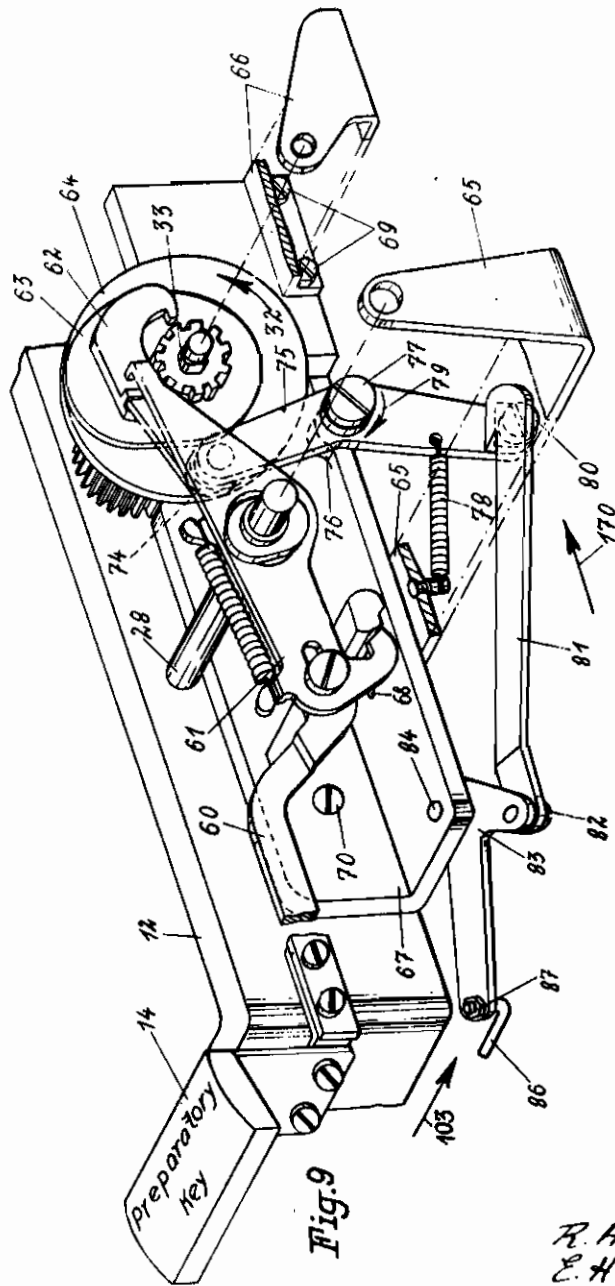


Fig. 9

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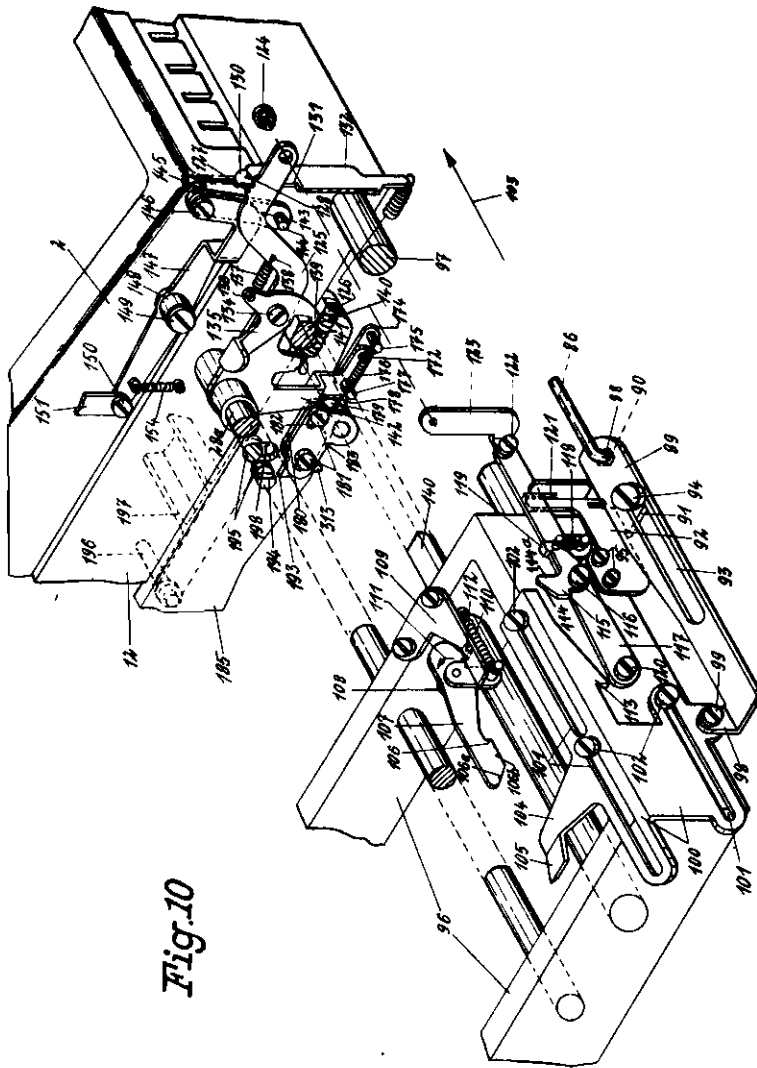


Fig. 10

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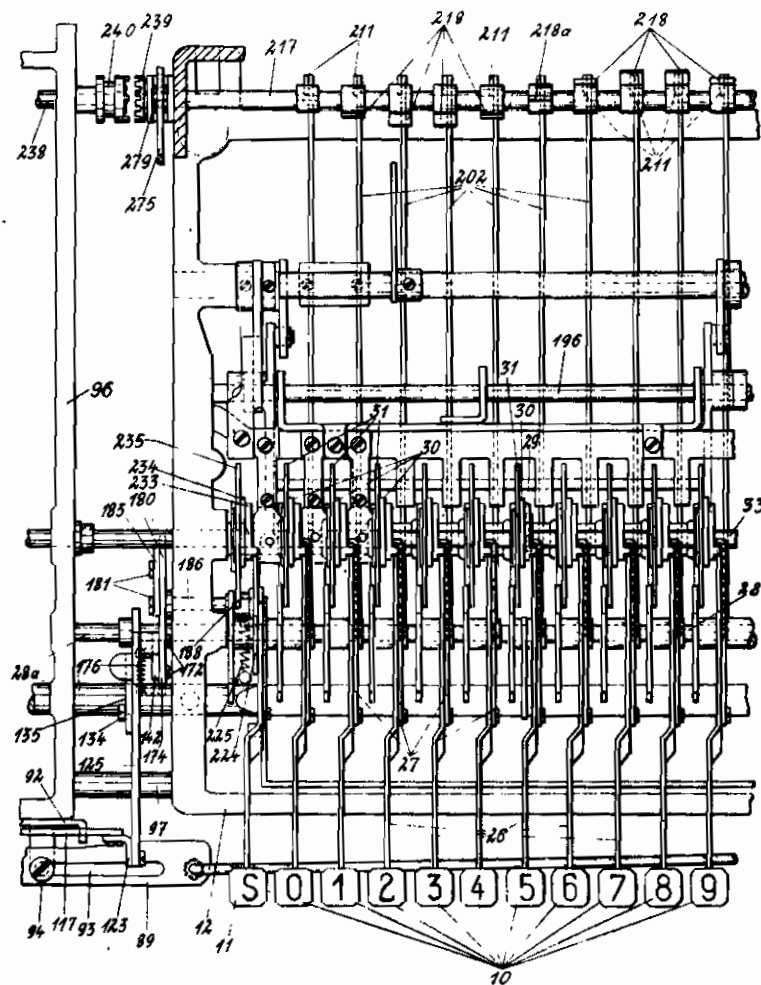
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Fig. 11



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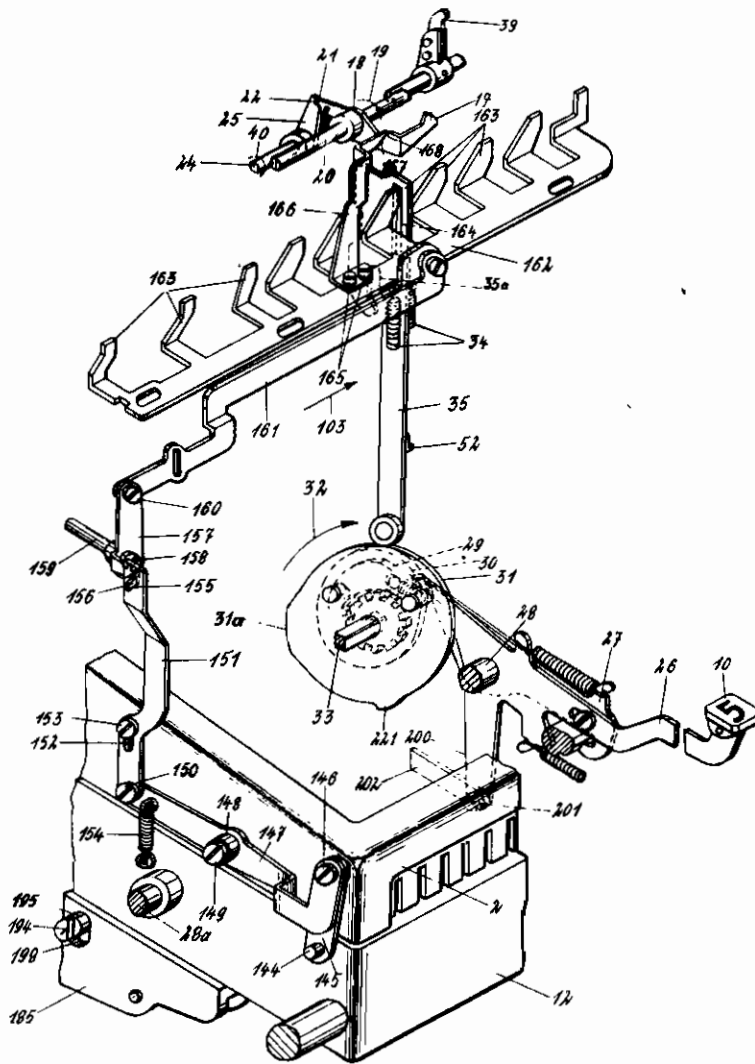
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Fig. 12



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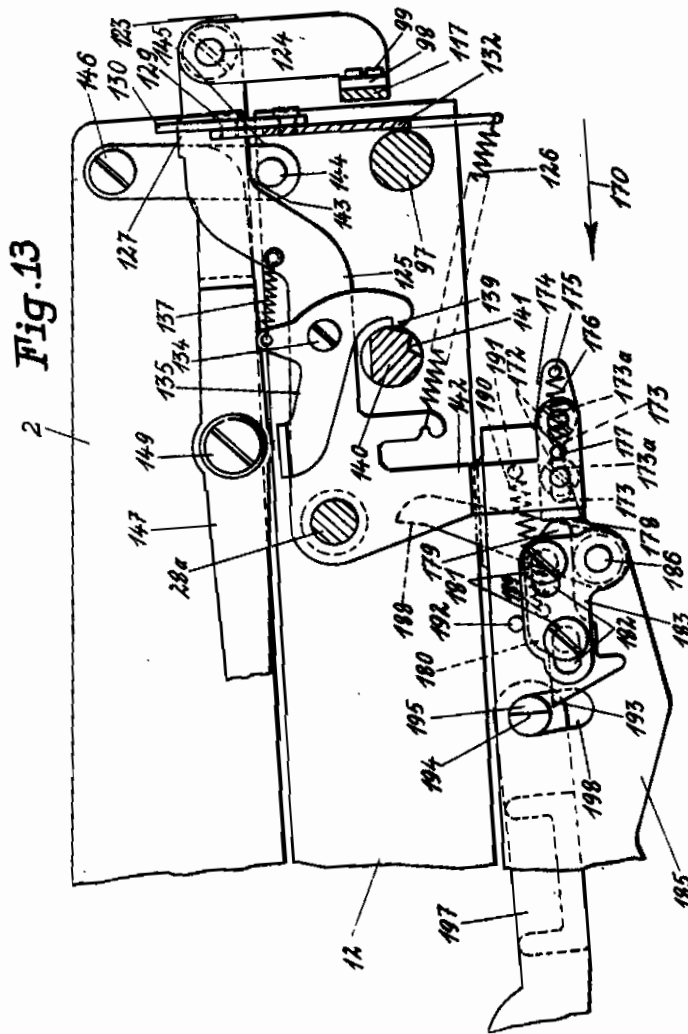


Fig. 13

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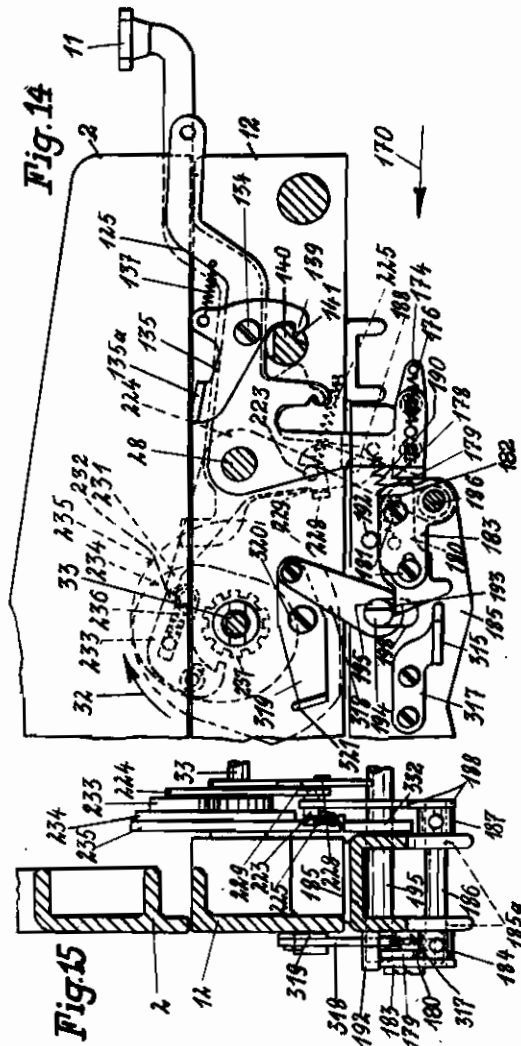
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Inventors,
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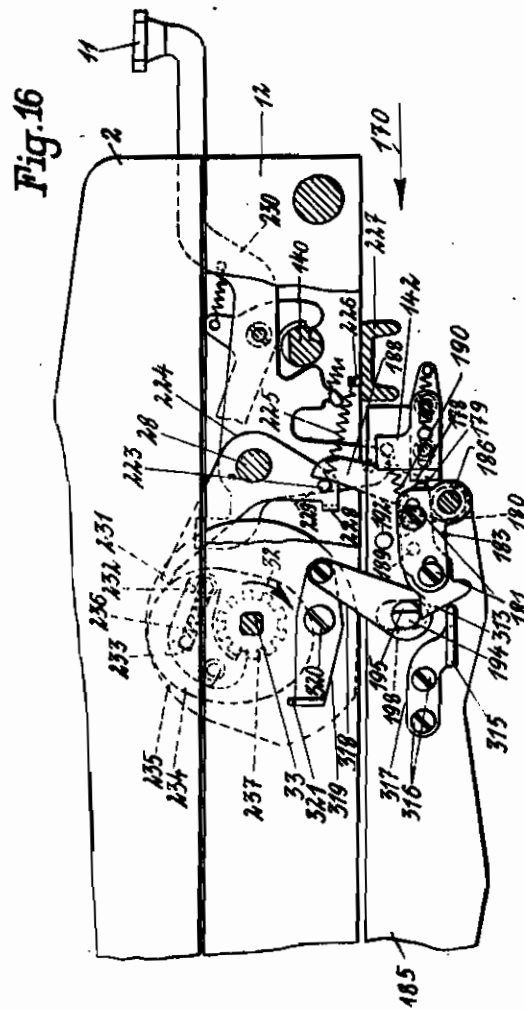
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22 Sheets-Sheet 15



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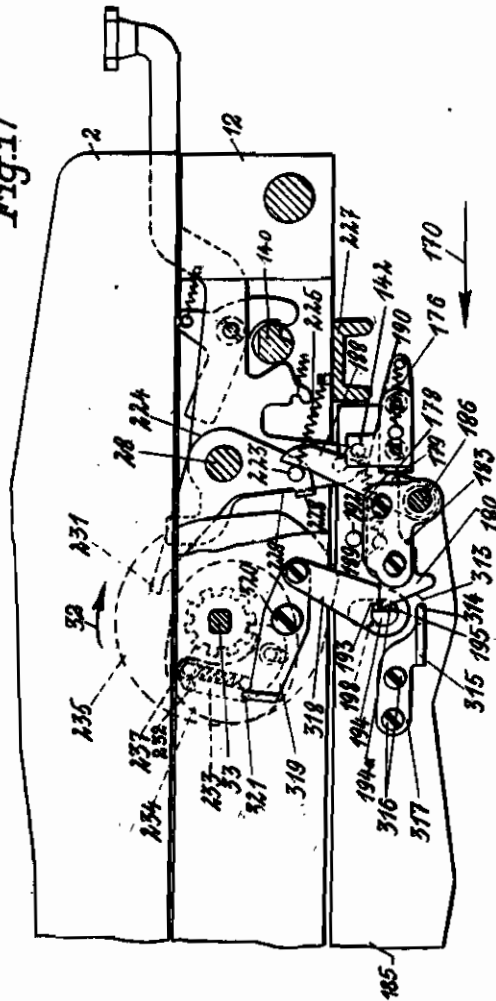
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Fig. 17



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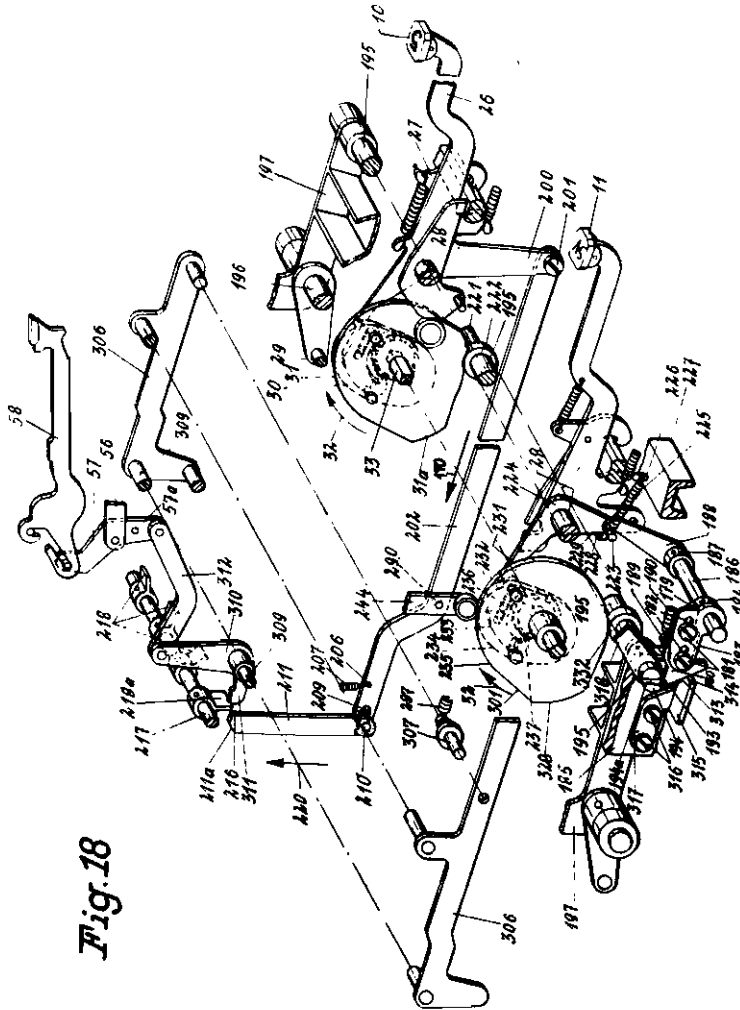


Fig. 18

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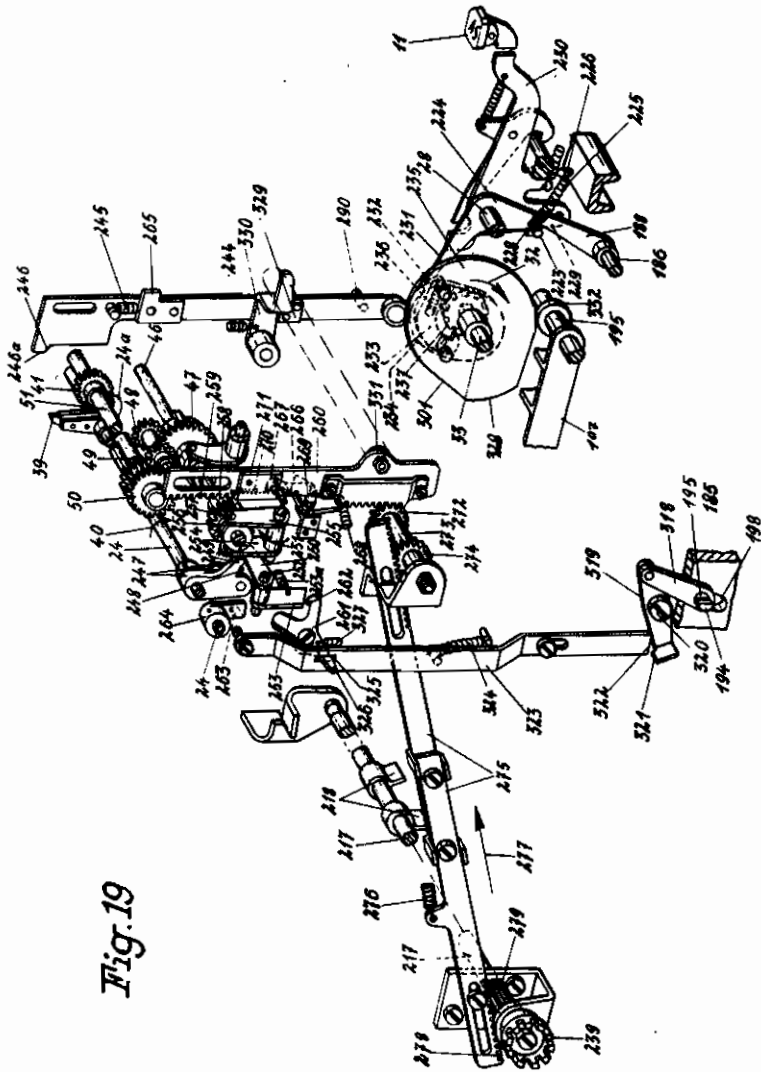


Fig. 19

Inventors,
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By: *Glascok Downing & Sebold*

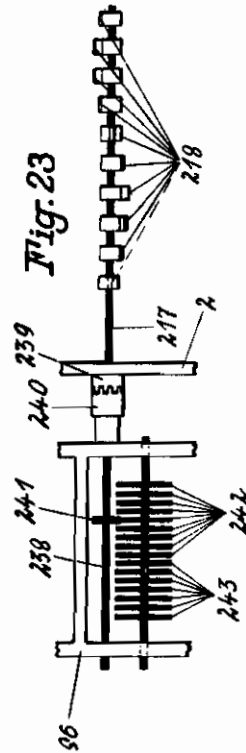
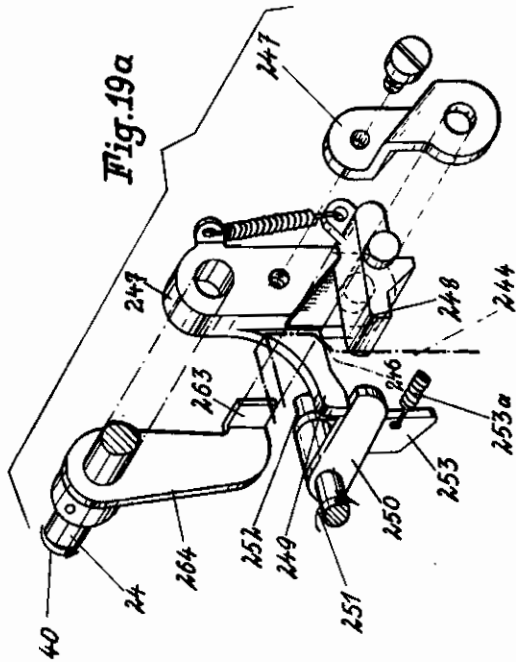
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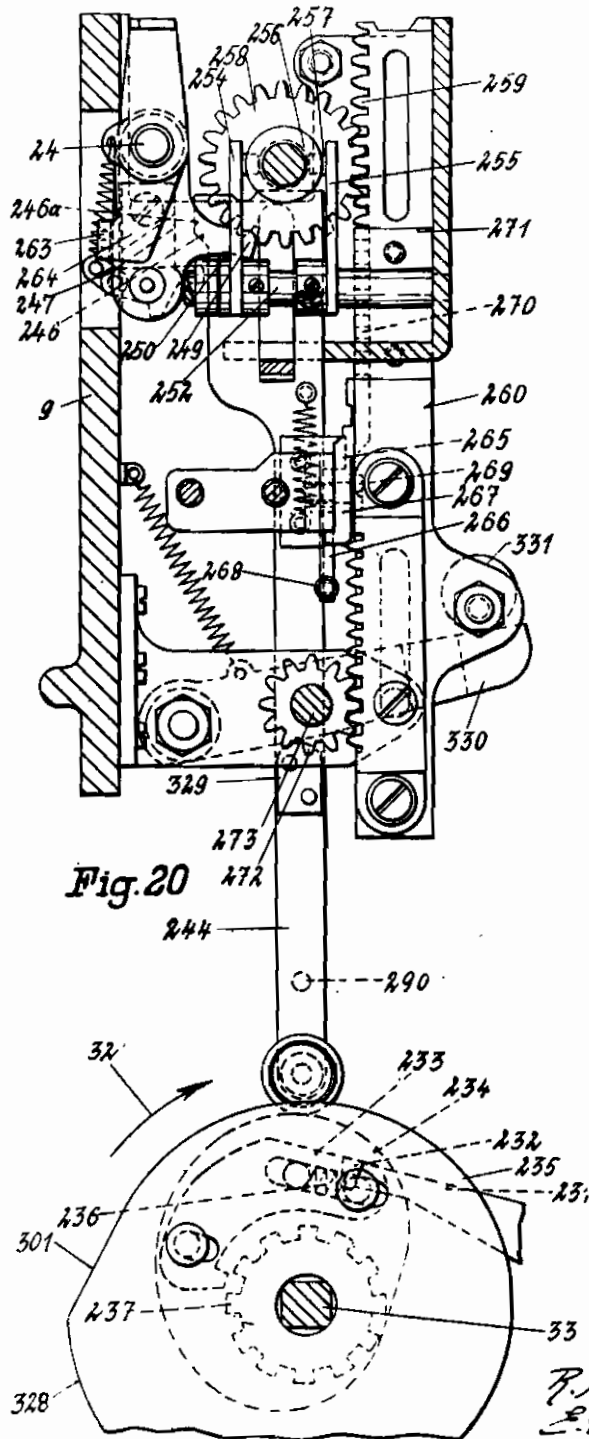


Fig. 20

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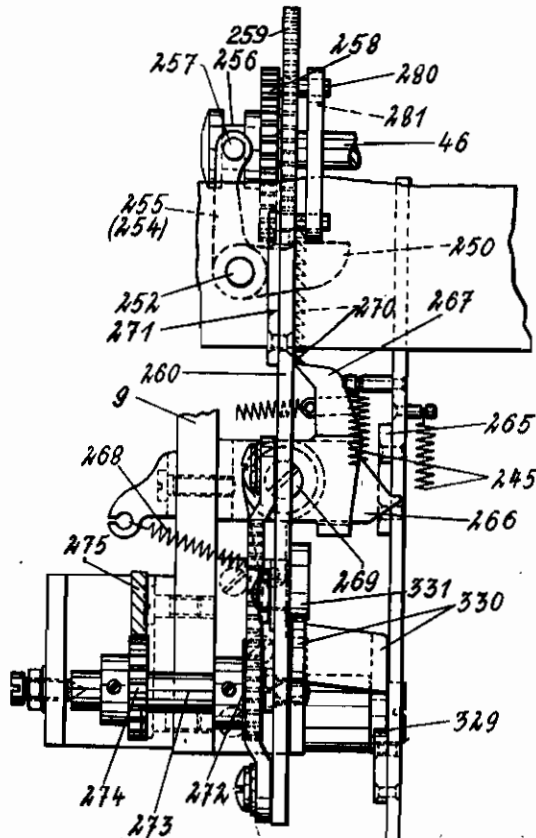


Fig. 21

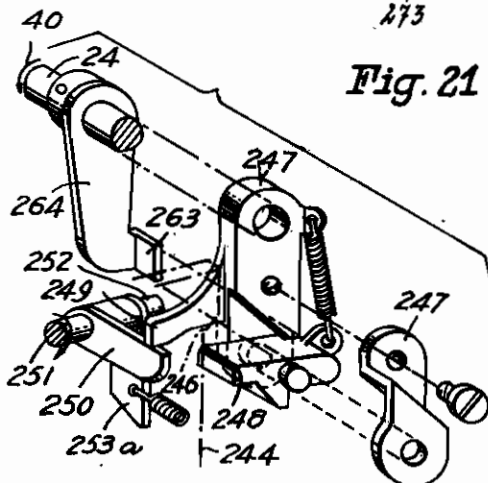
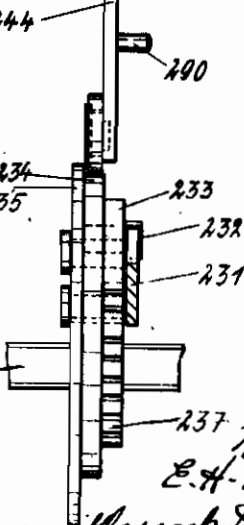


Fig. 19a



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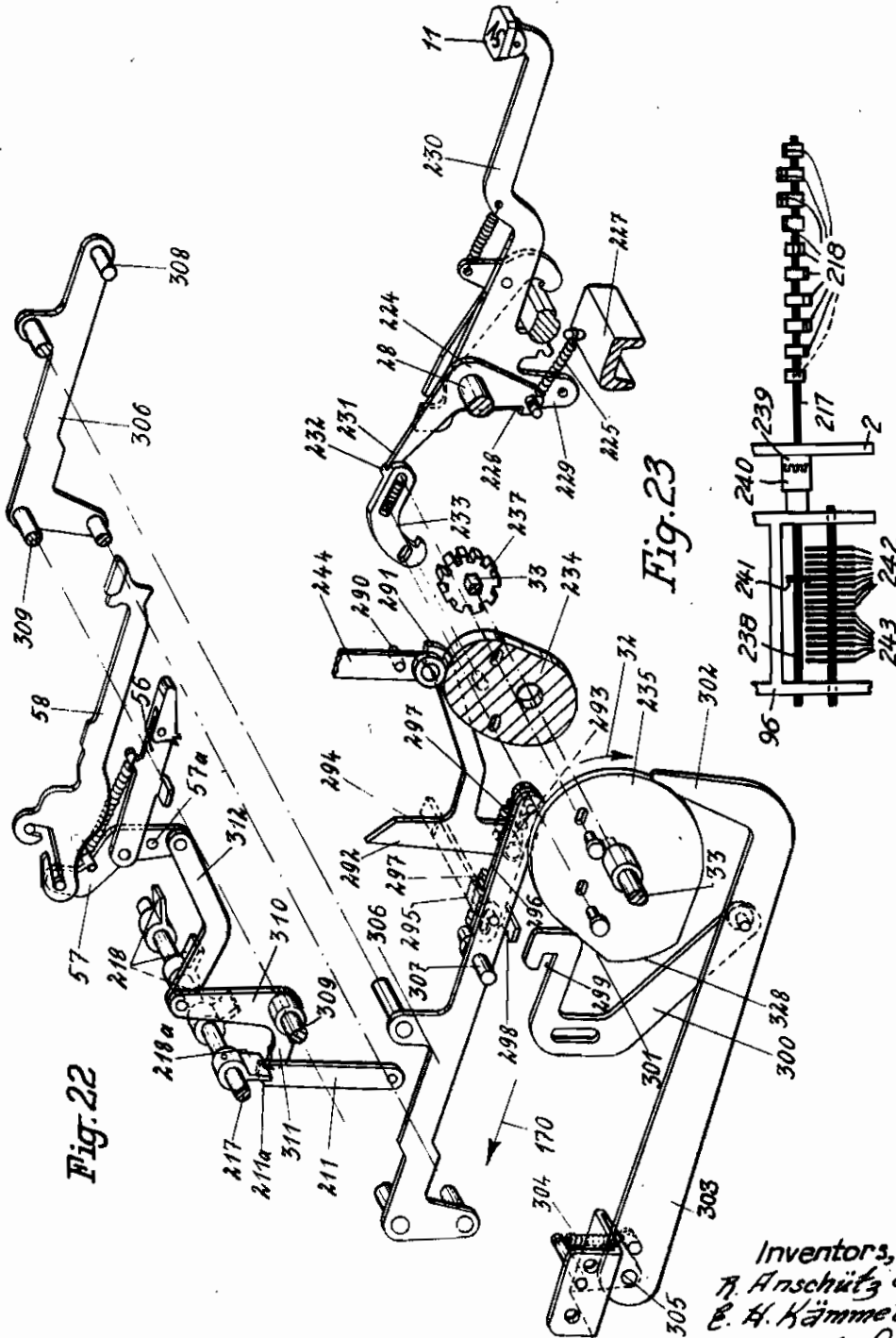
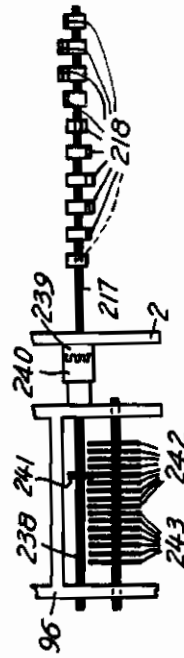


Fig. 22

Fig. 23



Inventors,
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by Mascock Downing & Sebold

ALIEN PROPERTY CUSTODIAN

BOOKING MACHINE, PARTICULARLY TYPEWRITING - CALCULATING MA- CHINE, EQUIPPED WITH TOTAL-TAK- ING MECHANISM

Robert Anschütz and Ernst Hugo Kämmel, Zella-
Mehlis, Thuringia, Germany; vested in the
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Application filed May 31, 1940

This invention relates to an accounting machine, particularly a typewriting-calculating machine equipped with total-taking mechanism.

Numerous devices have already been proposed with a view to also carry out multiplications on typewriting-calculating machines, since only then a really useful accounting-machine would be obtained. With the machines of this kind on the market the multiplication was carried out by a device consisting of certain contacts and magnets. This, however, proved to be a constant source of trouble which developed with the electric circuits and was difficult to locate and remove.

These disadvantages are eliminated according to the present invention by a control device which makes ineffective the operation of the counting mechanism, already known, during addition and subtraction and operates the counting mechanism for a multiplication device which can be attached to the machine in one unit. In the drawings a constructional example of the device according to the invention is illustrated:

Fig. 1 is a left front perspective view of a typewriting calculating machine according to the invention.

Fig. 2 is a left side view of the typewriting-calculating machine in which for better display of the single parts the coverplate as well as the multiplication device have been omitted, also the machine frame is shown partly interrupted.

Fig. 3 is a left side view of the machine, according to fig. 2, in which mainly the calculating features are shown.

Fig. 4 shows a portion of fig. 3 in which some parts are illustrated in operating position.

Fig. 5 is a front view of the preparatory device for the multiplication in rest position, some parts have been interrupted.

Fig. 6 is a front view similar to fig. 5, in which the preparatory device for the multiplication is shown in operative position.

Fig. 7 is a plan view on the preparatory device according to fig. 5 in rest position.

Fig. 8 is a plan view on the preparatory device according to fig. 5, in operative position.

Fig. 9 is a right front perspective view of the preparatory key and the parts controlled by same.

Fig. 10 is a left front perspective view of further parts of the preparatory device for the multiplication with some parts remote from each other.

Fig. 11 is a plan view on the base part of the machine with some parts interrupted.

Fig. 12 is a left front perspective view of single

calculating-units as well as the locking device for the counting slides and some control parts for the locking device.

Fig. 13 is a left side view of some control parts for the mechanism for introducing the formation of values, in rest position.

Fig. 14 is a left side view of the device for introducing the formation of values, in the preparatory position.

Fig. 15 is a front view of the parts, according to fig. 14.

Fig. 16 is a left side view of the device, according to fig. 14, showing some parts, however, in the position in which they have released the control clutch for the total-taking mechanism for operation.

Fig. 17 is a left side view of the device according to fig. 14, showing some parts in non-operative position.

Fig. 18 is a left front perspective view of several adjustment- and control parts for the device for forming the values, in which for obtaining a better view some parts are shown remote from each other as well as interrupted.

Fig. 19 is a left front perspective view of some gears of the total-taking mechanism, in which for better illustration some parts are shown remote from each other as well as interrupted.

Fig. 19a is a detail of fig. 19.

Fig. 20 is a left side view of some parts shown in fig. 19.

Fig. 21 is a front view of the parts according to fig. 20.

Fig. 22 is a left front perspective view of the recording device of the total-taking mechanism, in which for clearer view some parts are shown remote from each other as well as interrupted.

Fig. 23 is a diagrammatic view of the device for introducing the value of the multiplication feature of the typewriting-calculating machine.

General description of the machine

The typewriting-calculating machine consists essentially of a frame 2, figs. 2 and 3 which is arranged inside of a cover-plate, fig. 1, and supports the typewriting-calculating mechanism. A paper carriage 5 is mounted to slide on the rails 3 and 4 of the frame 2. A number of column totalizers and idle totalizers 7 and 8 are suspended at a predetermined place from the suspension rail 6 which is attached to the paper carriage 5. A calculating mechanism 9 is mounted on the front side of the frame 2. The addition- and subtraction values can be introduced into the column totalizers 7 by means of the cal-

calculating keys 10 and the control clutches 29, 30, 31, fig. 3, cooperating with same. For the purpose of automatically registering a sum which has been calculated in one of the column totalizers 7, a total-taking mechanism according to Patent-application Ser. Nr. 146,897 has been provided within and at the frame 2 or within and at the calculating mechanism 9, this total-taking mechanism can be controlled by a total-taking key 11 by way of the control clutches 233, 234, 235, fig. 2. The keys 10 and 11 as well as their control clutches are arranged in a storage frame 12 located below the frame 2, figs. 2, 3, 11. A decimal tabulator keyboard 13, figs. 1 and 3, located at the same place, makes it possible to tabulate the paper carriage 5 into the required position.

For the multiplication of two values according to the invention a preparatory device for multiplication which is controlled by the key 14 as well as a multiplying mechanism which is controlled by the key 15 have been provided inside and outside (that is to say, to the right and left) of the storage frame 12. A motor, not shown, which is attached to the right side of the frame 2, by means of the respective gears serves to start the various devices controlled by the keys 10, 11, 14, 15 as well as the printing mechanism and the automatic carriage sliding.

For better understanding the present invention it is suggested to carry out the normal procedure of calculating addition- and subtraction values as follows:

Normal calculating- and printing procedure when additive values are introduced

Assuming by way of example that the value "5" shall be introduced additively into one of the column totalizers 7. After the paper has been placed in the machine the paper carriage 5 by depressing the respective tabulator key of the decimal Tabulator keyboard 13 is tabulated to that place where the calculating place of the column totalizer 7 mentioned above receiving the value "5" is in operative position. When the column totalizer 7 has been placed into the chosen operative position the control bar 16, Fig. 3, engages the lug 17, Fig. 12, of the catch lever 18 which normally locks the parts of the calculating mechanism 9 and moves the catch lever 18 around the shaft 20 in the direction of arrow 19. Simultaneously the lug 21 of the catch lever 18 leaves the recess 22 of the finger 25 rigidly mounted on the shaft 24. Now, the calculating key 10, Figs. 3 and 12, which corresponds to the figure "5" is depressed and thereby the key lever 26 as well as the catch lever 27, which is mounted to slide on the same and holds the calculating key in depressed position, are moved clockwise around the shaft 28. Consequently the control clutch 29, 30, 31 which cooperates in known manner with the key lever 26 of the figure "5" is coupled with the driving shaft 33, which is constantly driven by the motor in the direction of arrow 32, for a complete revolution. When the control clutch 29, 30, 31 is turned, the counting slide 35 which has been in constant driving connection with the cam 30 by the springs 34, follows the declining part of the cam 30 so that the counting slide 35 is therefore descending vertically. At the beginning of the downward movement the decline 36, Fig. 3, of the counting slide 35 acts upon the ledge 37 whereby the parts 38, 24, 25, 39, are moved in the direction of arrow 40. In this manner on the one hand by the

finger 39 that particular calculating place of the column totalizer 7 which is just in operative position is prepared for receiving the value and, on the other hand, the lock 24a, 41, Fig. 19, is released. During the continued declining movement of the counting slide 35, the curved slot 35a by means of the usual counting members 42 till 51 and 41, Figs. 3 and 19, which have already been coupled in the known manner in dependence of the described movement of the shaft 24, introduces the value "5" into the calculating place of the vertical counting mechanism 7 tabulated in operative position.

Shortly before the counting slide 35 has finished its declining move, its lug 52, Fig. 3, engages the printing key lever 53 which corresponds to the figure "5" and moves the same clockwise around the rail 54. In this way, by means of the intermediate member 55, the driving connection is made between the lever gears 56, 57 of the type lever 58 of the figure "5" and the cam shaft 59 which is constantly driven by the motor in a clockwise sense. Simultaneously the type lever 58 with the figure "5" is brought to print upon the paper located before the typing roller of the paper carriage 5 in known manner. Upon receding of the type lever 58 then follows the usual switching of the carriage. During the continued turning of the control clutch 29, 30, 31, the rising part of the cam 30 again engages the counting slide 35 and causes it to be moved upwards and back again into its original position against the action of the springs 34. All the rest of the gears are returned into rest position in like manner. Simultaneously at the completion of a full turn the control clutch 29, 30, 31 is released again from the driving shaft 33 and the levers 26, 27 are moved back into rest position.

The calculation procedure described above is known in all its details and has been resumed only for better understanding of the present invention described as follows:

The multiplicand as well as the multiplier are simultaneously introduced by the calculating keys 10 when carrying out a multiplication on the typewriting-calculating machine. The customary calculating mechanism 9 of the typewriting-calculating machine is not suited for a multiplication since no calculation of a value having several places, for instance, a multiplicand with a value having several places, for instance, a multiplier is possible, but only the decimal formation of a value introduced by places is possible by transferring the introduced value decimally to the column totalizer which happens to be in operative position.

Therefore the multiplicand and multiplier are introduced into a multiplying mechanism which is conveniently arranged at the left beside the machine frame 2 and 12 in a suitable manner. But these features do not represent the object of the present invention so that they need not be discussed any further. When introducing the multiplicand and the multiplier into this multiplying mechanism by means of the customary calculating keys 10 of the typewriting-calculating machine, it is necessary, of course, to eliminate the mechanism for introducing additive and subtractive values as described above for the reason that when a calculating key 10 is depressed its corresponding value can be introduced only into one column totalizer 7 through the counting slides 35. For this reason the preparatory key 14, Fig. 1, is struck be-

fore beginning to introduce the multiplicand as well as the multiplier, whereby the mechanism described in the following is controlled.

Arrangement of a preparatory mechanism for the multiplication

A control mechanism 26, 27, 29, 30, 31, Figs. 11 and 12, cooperating with each calculating key 10 of the Figures "0-9" and corresponding to the control mechanism 60, 61, 62, 63, 64, Figs. 7 and 9, has been arranged to the right outside the frame 12. For this purpose the driving shaft 33 and the supporting shaft 28 have been extended to the right so that the right end of the supporting shaft 28 is held by a bracket 65 and the right end of the driving shaft 33 is held by a bracket 66. Both brackets 65 and 66 are bolted to the angle piece 67, which is U-shaped at its rear end, by means of the bolts 68 and 69. The angle piece 67 itself is bolted to the right side-wall of the supporting frame 12 by means of the bolts 70. At this side of the supporting frame 12 a guide-angle piece 72, Fig. 5, has been attached by the bolts 71 and the key lever 80 of the control mechanism 60 till 64, Fig. 9, is operated in its slot 73. At the front end of this key lever 66 is the key button 14 bearing the inscription "preparatory key". The cam 63, Fig. 9, of the control lever 62, 63, 64 cooperates with a roller 74 which is mounted for rotation on a double-arm lever 75. The latter is arranged to swing around a headed screw 77 fastened in a socket 76 of the supporting angle piece 67 and constantly tends to move in the direction of arrow 79 by the pull of the spring 76, so that its roller 74 is constantly kept in touch with the circumference of the cam 63. A tie rod 81 is jointed to the downward arm of lever 75 by means of the bolt 80. This tie rod 81 is also jointed to the shorter arm of an angle lever 83 by means of the bolt 82. The angle lever 83 is mounted for rotation on a headed screw 84 at the bottom side of the supporting angle 67. A tie rod 86 engages in a bore hole 85, Figs. 5 till 9, of the longer arm of the angle lever 83 and is held in place by the nut 87. This tie rod extends across the length of the machine frame 2, 12 and with its left end engages in a bore hole 86, Figs. 5, 7 and 10 of a slide 89, where it is also secured by the nut 90. The slide 89 can be moved horizontal to the bevelled lug 91 of a guide member 92, which is facilitated by the headed screw 94 screwed in the lug 91 and extending through a guide slot 93 of the slide 89. The guide member 92 is bolted by the screws 95 to the front wall of a frame 96 which is again rigidly connected with the supporting frame 12 by the connecting bars 97, Figs. 2 and 8. A multiplication mechanism which lies outside the scope of the present invention is also arranged in and at this frame 96 in the most suitable manner.

The slide 89 is connected by its bevelled lug 98, Figs. 5, 6, 7, 8 and 10, with a suitably designed slide 100 according to Fig. 10, by means of the screw 99. The slide 100 is mounted for sliding horizontally in the frame 96 by means of longitudinal slots 101 through which the headed screws 102 extend. Under the action of the spring 78, Fig. 9, the slide 89, Fig. 10, by way of the members 75, 61, 83 and 66 as well as the slide 100 constantly tend to move in the opposite direction of arrow 103 and simultaneously when in rest position the right edges of the guide slots 93 and 101 will be placed alongside of the

headed screws 94 and 102 extending through them. A lug 105 is provided at a rearwardly extending arm 104 of the slide 100. When the slide 100 is moving towards the right, the lug 105 is able to engage with a lug 106a of a locking lever 107 which by means of the pivot 108 is mounted for rotation on a supporting member 109 bolted to the frame 96 and tends to move in direction of the arrow 111 by the spring 110, while in rest position, the bevelled lug 112 of the locking lever 107 lies close to the base part of the supporting member 109.

A lug 113 is provided at the slide 100, Fig. 10. This lug 113 is able to cooperate with a bevel 114 of a pawl 115 which by means of pinion 116 is mounted for rotation on a lever 117. The pawl 115 tends to move clockwise by the action of the spring 118, when in rest position a bevelled lug 119 of the pawl 115 is placed on the upper edge of the lever 117. The lever 117 is mounted to swing on the front wall of the frame 96 by means of a pinion 120 and is guided in the slot 121 of the guide member 92. A part 123 is jointed to the right end of the lever 117 by a screw 122. The forward end of a lever 125 is jointed to the member 123 by a screw 124. The lever 125 is mounted to swing on a left extension 28a of the supporting shaft 28 and tends to move anti-clockwise, Fig. 10, by the pull of the spring 126 until such movement is stopped by the projection 127 striking against the edge 128 of a member 130, Figs. 5 and 10. The latter is bolted to the lever 125 in a slot 131 and guided by the supporting angle piece 132. This angle piece 132 is rigidly fastened to the frame 96 by the screws 133, Figs. 5 and 6. A catch pawl 135 is mounted to swing on the lever 125, Fig. 10, by the pinion 134. One end of a tension spring 137 is fastened in a bore hole 136 of the catch pawl 135, whilst its other end is suspended from a bore hole 138 of the lever 125. By the action of the spring 137, the catch pawl 135 constantly tends to move clockwise and its normal position is fixed by the lug 139 striking against the ratchet 140 which is fastened to the supporting frame 12 as well as to the frame 96. The lug 139 of the catch pawl 135 is able at the proper moment to engage in a notch 141 of the ratchet 140. Certain members to be discussed later under the heading "Preparation for a device to be used as clutch for the total taking mechanism" are mounted to the downward flanged arm 142 of the lever 125.

The lever 125 during its clockwise movement around the shaft 28a is able to engage by its lower edge 143 with a pin 144. The latter is fastened in a member 145, Figs. 5, 7, 10, 12, which is jointed to a lever 147 by a screw 146. The lever 147 is mounted to swing by its hub 148 around a pinion 149 which is screwed in the left sidewall of the machine frame 2. A bar 151 is jointed to the lever 147 by the screw 150. A headed screw 153 which is screwed in the machine frame 2, protrudes through a longitudinal slot 152, Fig. 12, of the bar 151, whereby the latter can be moved up and down at the machine frame 2. The lever 147 is moved anti-clockwise around the screw 149 by the action of the tension spring 154 and consequently the bar 151 is moved downwards and its normal position fixed by the upper edge of the slot 152 of the bar 151 striking against the headed screw 153. The bar 151 at its upward pointed end has an opening 155 through which protrudes a flanged lug 156 of a lever 157 which by the pin 158 is mounted to swing on a support-

ing member 159 fastened in the calculating frame 9, Fig. 2. A slide 181 is jointed to the lever 157 by means of a screw 160c. The right end of this slide 161 is connected with the known ratchet 162 which is arranged to slide in the frame 9 of the calculating mechanism. The teeth 163 of the ratchet 162 are able to engage in the longitudinal slots 164 of the known ten counting slides 35, referring to the figures "0" to "9" (in Fig. 12 only one counting slide is illustrated). A member 168 is fastened to the ratchet 162 by screws 165. The oblique part 167 of the member 166 is able to engage the upper edge 168 of the pawl 18 which normally locks the operative members of the calculating mechanism.

Operation of the preparatory mechanism for the multiplication

To carry out a multiplication, the paper carriage 5, Fig. 1, of the machine, which is supposed to be in the right-hand position, is first tabulated into the corresponding decimal place with the respective column totalizer in which the multiplicand shall also be introduced, besides its introduction into the multiplicand apparatus 242 of the multiplication mechanism illustrated in Fig. 23. If, however, the retaining of the multiplicand of the multiplier in the column totalizers is not required, the latter are replaced by zero totalizers on the totalizer suspension rail 6. Then the preparatory key 14 is depressed, whereby the key lever 60 and the slide 61, Fig. 9, are moved anti-clockwise around the shaft 28. Consequently the control clutch 62, 63, 64 is connected in known manner for a complete turn with the driving shaft 33 which is moved in the direction of arrow 32. During the first half-turn of the control clutch 62, 63, 64 the rising curved part of the cam 63 engages the roller 74 of the lever 75 and moves it around the pinion 77 in the reverse direction of arrow 79 and against the action of the spring 78. In this way the draw hook 81 is moved in the direction of arrow 170, Figs. 7 to 9, whereby the angle lever 83 tends to move anticlockwise around the pivot 84 from the position illustrated in Fig. 7 into the position illustrated in Fig. 8. Simultaneously the angle lever 83 pulls the draw-bar 86 in the direction of arrow 103. The draw-bar 86, Figs. 5 to 8 and 10, therefore tends to move the slide 89 and through same also the slide 100 in the same direction towards the right. During this sliding movement of the slide 100 the incline of the lug 113 cooperates with the incline 114 of the pawl 115 and through the driving connection 119, 117 moves the lever 117 clockwise around the pivot screw 120. Simultaneously the lever 117 moves the member 123 downwards and the latter owing to the screw connection 124, moves the lever 125 clockwise around the shaft 28a against the spring 126. Its lower edge 143 also engages the pin 144 of the member 145, Figs. 10 and 12, whereby the member 145 is moved downwards and consequently the lever 147 is moved clockwise around the pivot screw 149, Fig. 12, against the spring 154.

During the clockwise movement of the lever 147, the bar 151, Fig. 12, is pushed upwards and through the driving connection 155, 156, also tends to move clockwise the lever 157 around the screw 158. Consequently the slide 161 is moved in the direction of arrow 103. The slide 161 also moves the ratchet 162 in the same direction, whereby the notches 163 of the ratchet 162 engage in the longitudinal slots 164, Fig. 6,

of the ten counting slides 35 (in Fig. 6 only three counting slides are illustrated) and prevent the counting slides 35 from moving downwards.

When the slide 100, Fig. 10, is moved towards right and reaches the point where the lug 113 has attained the highest point of the incline 114 of the pawl 115, the movement of the members 117, 123, 125, 145, 147, 151, Fig. 12, 157, 181 and 162 has also been completed. At this moment, by the action of the tension spring 137, Fig. 10, which is fastened to the lever 125 and to the catch pawl 135, the catch pawl 135 of the lever 125 by its lug 139 engages in the locking notch 141 of the ratchet 140 and in this way holds the lever 125 as well as the members 117, 123, 145, 147, 151, 157, 161 and 162 in the position illustrated in Fig. 6.

When the slide 100 is moved further towards right its lug 105 also engages the bevel lever 106a, Fig. 10, of the lug 108 of the catch lever 107, whereby the latter tends to move against the action of its spring 110 in the opposite direction of arrow 111 and is held in this position until the lug 105 releases the lower edge 108b of the lug 108 of the catch lever 107. As soon as the lug 105 releases the lug 106, the catch lever 107 owing to the tension of the spring 110 snaps back into its rest position according to Fig. 10 and thereby is moved by its lug 106 in front of lug 105 of the slide 100 which in this way is prevented from moving towards left. At this moment the highest point of the raised curved part of the cam 63, Fig. 9, of the control clutch 62, 63, 64 has been moved to a place opposite the roller 74, whereby the lever 75 as well as the members 81, 83, 86, 89 and 108 connected with it, have completed their prescribed movement and are held in this position owing to the above mentioned locking mechanism 106, 105, Figs. 6 and 8.

The control clutch 62, 63, 64 now completes the remaining turn of a complete revolution without engaging any other members. After completion of the full revolution, the levers 60, 61 are then moved back into rest position in known manner and the control clutch 62, 63, 64 is again released from the driving shaft 33.

Simultaneously with the elimination process of the customary calculation of additive or subtractive values when striking a calculation key 10, as described above and further explained under the heading "Normal calculating- and printing process during the introduction of additive values," according to the present invention a suitable device has been constructed which moves the mechanism for introducing the value of the multiplicand and multiplier into operative position. In order to introduce the values of the multiplicand and multiplier, according to the present invention the customary device for automatic zero-printing of column totalizers, as described in Patent application Ser. Nr. 146897, is also made use of. The real process of introducing the values will be described in detail under the heading "Introduction of values." In the following shall be explained for the present the preparation of that mechanism which is designed to connect the total-taking mechanism described in the above-mentioned patent with the driving mechanism in dependence of the striking of the calculating keys.

Preparation of a device for connecting and disconnecting the total-taking mechanism

The screws 172 are attached to the downward extending arm 142, Figs. 10 and 13, of the lever

125 and protrude through the longitudinal slots 173 of a slide 174. A pin 175 is riveted to the slide 174 and a spring 176 is attached with one end to the pin 175 and with its other end to the pin 177 which is attached to the arm 142 of the lever 125. The slide 174 constantly tends to move in the direction of arrow 170 by the action of the spring 176 until the front edges 173a of its longitudinal slots 173 strike against the screws 172, Fig. 13. The slide 174 is able to engage by its rear edge 178 with the lug 179 of a second slide 180. The slide 180 is arranged to move back and forth on a member 183 on which the screws 181 protrude through the longitudinal slots 182. The member 183 is fastened by its fulcrum 184, Figs. 15 and 18, to the shaft-end 188 which is resting in bore-holes 185 of an auxiliary member 185 which supports the frame work 12. A lever 186 is rigidly mounted at the right end of the shaft end 188 by its fulcrum 187. One end of a tension spring 190 is attached to a pin 189, Fig. 18, which is riveted in the slide 180 whilst the other end of the spring 190 is attached to the pin 191 which is attached to the lever 125, Fig. 13. By the action of this spring 190, the members 180, 183, 188 and 186 constantly tend to move clockwise, Fig. 13, until such movement is checked by the upper edge of the member 183 striking against a stop 192 which is screwed in the supporting member 185. Simultaneously owing to the action of the spring 190, the slide 180 tends to move in the opposite direction of arrow 170 causing the lug 179 of the slide 180 to be in constant contact with the rear edge 178 of the slide 174.

The slide 174 by the action of the spring 176 also participates in the clockwise movement of the lever 125, Figs. 10 and 13, around the supporting shaft 26a, as described, which movement is controlled in dependence of the operation of the preparatory key 14. The slide 174 with its rear edge engages the lug 179 of the slide 180 and moves same against the action of the spring 190 in the direction of arrow 170, Fig. 14. As a consequence, a rearwardly directed lug 193 of the slide 180 is moved into the path way of an abutted lug 194 of a shaft 195. This shaft 195 is mounted in a swing-frame 197 which swings around the supporting shaft 198, Fig. 2, and with its left end protrudes through a longitudinal slot 188, Fig. 13, in the supporting member 185. This driving connection 194, 193, which is also activated by depressing the preparatory key 14 for the multiplication, is maintained in upright position owing to the locking notch 139, 141 which engages in the swung-out position of the lever 125, Fig. 14.

After the typewriting-calculating machine has been prepared for multiplication in the hitherto described manner, the multiplicand which for example, may begin with the figure "5" is now introduced. For this purpose the calculating key 10 which corresponds to the figure "5" is struck and the following operations performed:

Mechanism for introducing the values

A downwards pointing arm 200 Figs. 3 and 18, has been provided at the key lever 28, of the respective calculating key 10 corresponding to the figure "5." A bar 202 is jointed to the arm 200 by a screw 201. The rearward pointing end of the bar 202 is guided in a longitudinal slot 204, Fig. 3, of a guide fork 205. A tension spring 207 is fastened at one end in a bore hole 206 of the bar 202 and with the other end in a suspension

member 208 attached to the guide fork 205. The bar 202 by the action of the spring 207 constantly tends to move clockwise around the screw 201 until its upper edge strikes against the upper end of the longitudinal slot 204.

A curved slot 209 has also been provided in the rearward pointing end of the bar 202. An embossed rivet 210 of a slide 211 protrudes through this slot 209. The slide 211 is mounted to slide vertically in the guide slots 212 and 213 of a U-shaped guide member 214. This guide member 214 to which also the guide fork 205 is bolted is fastened by screws to the cross member 215 of the frame work 12.

These members 200, 201, 202, 204, 207, 208, 208, 210, 212, 211 and 213 are likewise connected with the remaining calculating keys 10 of the figures from "0" to "9."

The customary lugs 218 which are connected with the automatic total taking mechanism have been arranged in semi-circular shape on the known shaft 217, Figs. 3 and 11, opposite the upward pointing lugs 216 of the slides 211. The arrangement of the total-taking mechanism has already been described in detail in the Patent application Ser. Nr. 146,897 so that its operation shall be described in the following only as far as it is necessary for the introduction of the multiplicand- and multiplier values.

Introduction of values

When the calculating key 10 which is connected with the figure "5" is depressed, its key lever 28 and the catch lever 27 are moved clockwise around the supporting shaft 28, Fig. 4, simultaneously the arm 200 tends to move the bar 202 corresponding to the figure "5" in direction of the arrow. The incline 209a of the curved slot 209 of the bar 202 now tends to move the rivet 210 of the corresponding slide 211 in the direction of arrow 220. Thereby the lug 216 of the slide 211 of the figure "5" is moved into the path way of the lug 218a of the shaft 217 corresponding to the figure "5" and in this manner the introduction of the multiplicand value "5" is completed.

During the introduction of the value "5," the known total-taking mechanism which has been described in the above mentioned patent is forcibly connected with the driving mechanism of the machine. For this purpose the following mechanism has been designed.

Mechanism for the introduction of the value formation

A lug 221 has been mounted on the cam 31, Fig. 18, of the control clutch 29, 30, 31, referring to the figure "5", as well as on the cam 31 of the control clutches 29, 30, 31, referring to the remaining figures "0" to "9". This lug 221 cooperates with the opposite roller 222 of the shaft 195 on which similar rollers 222 are mounted opposite the other cams 31. The shaft 195 is able to control by its lug 194 the known members 183, 180, 183, 186 and 186.

The lever 186, Figs. 14 and 18, cooperates with a pin 223, Fig. 18, which is fastened to a catch lever 224 mounted to swing around the supporting shaft 26. A tension spring 225 is fastened to the pin 223 of the catch lever 224 and with its other end the spring 225 is fastened to a bolt 226 which is held in a customary U-shaped clamp 227 of the frame work 12. The catch lever 224 by the action of the spring 225 constantly tends to move anti-clockwise around the shaft 26, whilst in

rest position a bevelled lug 228 strikes against a downwards pointing arm 229 of a the key lever 230 of the total-taking key 11. A rearward pointing arm 231 of the catch lever 224 cooperates with the lug 232 of the clutch pawl 233 of the known control clutch 233, 234, 235 connected with the total taking key 11 and normally keeps the clutch pawl 233 from engaging the coupling gear 237 mounted on the driving shaft 33 against the action of the pressure spring 236.

Introduction of value formation

When depressing the calculating key 10 of the figure "5", the control clutch 29, 30, 31, Fig. 4, which in known manner is also connected with the calculating key, is connected for a complete revolution with the driving shaft 33 in the direction of arrow 32. At the beginning of this turning movement the lug 221 of the cam 31 engages the roller 222 of the shaft 195, whereby the swing frame 197, Fig. 3, is swung clockwise around its supporting shaft 196. It should be noticed, however, that the movement of the swing frame 197 in this case only covers a partial way of the swing movement required for the support of a shifting step of the paper carriage of the typewriting-calculating machine.

During the swing movement of the swing frame 197 its shaft 195 slides downward into the guide slot 198 of the supporting member 185. Simultaneously the lug 194, Fig. 14 and 16, of the shaft 195 engages the lug 193 of the slide 180 moving the same and, owing to the screw slot connection 181, 182, also the part 183 and the shaft-end 186 anti-clockwise, Fig. 16, against the spring 190. The lever 188 also participates in the swing movement of the shaft-end 188 and engages the pin 223 of the catch lever 224 thereby swinging out the pin 223 clockwise around the supporting shaft 28 against the tension spring 225. Consequently the arm 231 of the catch lever 224 is disengaged from the lug 232 of the clutch pawl 233, so that the latter by the action of the pressure spring 236 tends to move towards the clutch wheel 237 and engages same. As a consequence, the cams 234, 235 are connected with the drive shaft 33 turning in direction of arrow 32.

Accordingly, the control clutch 29, 30, 31 of the figure "5" as well as the control clutch 233, 234, 235 of the total-taking device participate simultaneously in the turning of the drive shaft 33 and the control clutch 233, 234, 235 takes up connection with the drive shaft 33, after the control clutch 29, 30, 31 has completed a turn of about 15°. Turning of the control clutch 29, 30, 31 does not influence the counting slide 35, Fig. 3 of the figure "5" in any way since the slide 35 is kept in rest position by the locking device 163, 164 owing to the previous depression of the preparatory key 14, as explained under the heading "Operation of the preparatory mechanism for the multiplication". It is further explained that owing to non-operation of the total-taking key 11, the zero key, not shown in the diagrams but designated in Patent application Ser. No. 146,897 with 154, which is brought into operative position by the total-taking key 11, can therefore not be operated.

As soon as the lug 221 of the cam 31 releases the roller 222 during the turning of the control clutch 29, 30, 31 of the figure "5", the swing frame 197 and also the members 180, 183, 186, 188 and 224 will return into rest position, Fig. 14, by the action of the spring.

Formation of values

The value "5" of the multiplicand is formed by the known total-taking mechanism owing to the control clutch 233, 234, 235 (Fig. 16 and 19) of the total-taking mechanism of the typewriting-calculating machine with the drive shaft 33, as follows:

The total-taking mechanism for the automatic decimal blank printing of the column totalizers of the typewriting-calculating machine has already been thoroughly explained in the Patent application Ser. Nr. 146,897. For quicker understanding however the operation of this mechanism shall be shortly described as far as it concern the forming of the multiplicand value "5". It is pointed out here that when depressing the preparatory key 14, a clutch mechanism, not shown, which can be controlled in dependence of the turning of the control clutch 233, 234, 235, is released in a suitable manner. Consequently, when the control clutch 233, 234, 235 is beginning to turn by way of this clutch arrangement, a clutch 239, 240, is operated which is located between the shaft 217, Fig. 23, of the total taking mechanism and the shaft 238 mounted to revolve in the frame 96 of the multiplying mechanism.

A small catch-wheel 241 is mounted on the shaft 238 for sliding but not for rotation. This catch wheel 241 by way of a system of coupling rods and in dependence of the paper carriage movement can be set into the respective decimal place of the multiplicand mechanism 242 receiving the multiplicand, as illustrated in diagrammatic view 23, into which the multiplicand value "5" shall be introduced. The catch-wheel 241 can of course also be set into the various decimal places of the multiplier value 243 of the multiplying mechanism receiving the multiplier. This done by way of the system of coupling rods mentioned above in dependence of the paper carriage movement. The raised part of the cam 234 of the control clutch 233, 234, 235 releases the unlocking mechanism 244 when the control clutch 29, 30, 31 connected with the figure "5" as well as the control clutch 233, 234, 235 (Figs. 18, 19 to 21) connected with the total-taking mechanism 11 are turned in the direction of arrow 32 and the unlocking mechanism 244 will slide downwards on the decline of the cam 234 under the influence of its springs 245. The oblique face 246 of the unlocking mechanism 244 during its downward movement cooperates with the member 248 which is arranged to get out of the pathway towards above inside of the member 247, Figs. 19, 19a, 20 and 21, which is mounted to swing loosely on shaft 24 and thereby moves the member 247 in direction of arrow 40. The lug 249 of the member 247 causes the lever 250 to swing in the direction of arrow 251. Simultaneously the shaft 252 and the lever 253, 254 and 255 participate in this movement causing the gear 258 to be moved towards the right by way of the driving connection 258, 257, Figs. 19 and 21, so that the gear 258 will mesh with the teeth 259 of the zero setting slide 280. The catch pawl 261 with its lug 282 now catches behind the lever 253 with the members 250, 252, 253, 254, and 255 in the above described position and consequently locks the lever 253 as well as the members 252, 250, 253, 254 and 255 in operative position.

The member 247 during its swing movement in the direction of arrow 40 also engages the square lug 263, Figs. 19, 19a, of the lever 264, which is rigidly mounted on the shaft 24. In this way the lever 284, the shaft 24 and the releasing finger 39,

which is mounted on the shaft 24 and unlocks the operative calculating position of a column totalizer, are also moved in the direction of arrow 40, as is also the lever 24a which locks the driving mechanism 41, Fig. 19. Consequently, that denomination of the column totalizer 7 tabulated into operative position, which is to accumulate the multiplicand value "5", is released for receiving the value and the device which normally locks the calculating mechanism 24a, 41, is unlocked.

The members 247, 264, 24, 24a, 39 are kept in operative position by the edge 246a during the continued decline of the unlocking mechanism 244. Simultaneously the lug 265 of the unlocking mechanism 244 engages the pawl 266 (Figs. 19, 10 and 21) and together with the catch pawl 267 tends to move it clockwise around the pivot 269 against the tension of spring 268. The catch pawl 267 is now disengaged from the ratchet 270 of the angle 271 mounted on the zero setting slide 260 so that the latter is released for a downward move and the gears 272, 273, 274 are released for clockwise movement. Consequently, the two-part slide 275 engaging the gear 274 can respond to the action of its spring 276 and be moved in the direction of arrow 277.

The teeth 270 of the slide 275 mesh with the gear 279 mounted on shaft 217, turning the shaft itself clockwise as well as the shaft 238 and the catch wheel 241 through clutch 239, 240, Fig. 23, until this movement is checked by the lug 218a, Fig. 4 of the shaft 217, which corresponds to the figure "5", striking against the lug 216 of the raised slide 211 of the figure "5". The turning movement of the members 217, 239, 240, 238 and 241 as well as that of the slide 275 would therefore in the present case amount to 5 units.

Owing to the turning of the members 217, 139, Fig. 23, 248, 230 and 241 by "5" units, the catch-wheel 241 will turn the opposite wheel of the multiplicand value 241 of the multiplying mechanism also by "5" units. In this manner the introduction of the multiplicand value "5" into the multiplying mechanism of the type-writing-calculating machine has been accomplished.

Introduction of the multiplier is done in the same manner with the exception that the catch roller 241 is controlled by the paper carriage movement so that it will be placed opposite a gear of the multiplier mechanism 243.

When the slide 275, Fig. 19, is moved in the direction of arrow 277 it turns the gears 274, 273, 272 clockwise so that the gear 272 will move the zero setting slide 260 downwards by five units. The teeth 258 of the zero setting slide 260 thereby turn the gear 258 and through the clutch 280, 281 also turn clockwise the shaft 46, Fig. 19. Simultaneously the shaft 51 and the driving gear 41 are also turned clockwise by "five" units through the gears 47, 48, 49, 50 and the driving gear 41 also transfers the "5" into the operative calculating place of the column-totalizer 7 accumulating the multiplicand.

The lug 265 of the unlocking slide 244 during its declining movement releases the pawl 266 and causes the same together with the catch pawl 267 to return into their initial position. Simultaneously the catch pawl 267 engages with the locking tooth 270 which has come to face it at the end of the decline of the zero setting slide 260 and in this way secures the set position of the members 260, 272 to 275, 217, 239 (Fig. 23), 240, 238 and 241.

Shortly thereafter the edge 246a of the unlocking slide 244 during its downward movement again

releases the member 248 so that the members 247, 283, 24, 24a and 39 again swing back into rest position and, owing to the lock 24a, 41 falling into place again, also secure the set position of the members 51, 50, 49, 48, 47, 46 and 258.

Printing of the multiplicand value

After the multiplicand value "5" has been formed in the above described manner and has been accumulated in the column-totalizer as well as introduced into the multiplicand feature 242 of the multiplication mechanism of the typewriting-calculating machine, the multiplicand value "5" is printed on the paper moved around the typing roller.

The mechanism of said printing device need not be explained here since a detailed description of same has been given in patent application Ser. No. 146,897 and the said printing mechanism shown in Figs. 2 and 22 differs only slightly from that referred to in the above mentioned patent. During the further turning of the control clutch 29, 30, 31 of the figure "5" as well as of the control clutch 233, 234, 235 of the total-taking mechanism (Figs. 19 to 22) in the direction of arrow 32 and during the consequent further decline of the unlocking slide 244, the pin 290 now engages the arm 291 (Figs. 2 and 22) of the lever 292, moving the latter clockwise around its pivot screw 293. Simultaneously the lever 292 by its front edge 294 engages the curve 295 of the slide 296 moving the latter against the action of its spring 297 in the opposite direction of arrow 170 and causing the square lug 298 of the slide 296 to engage in the slot 299 of the lever 300.

During the further turning of the control clutches 29, 30, 31 and 233, 234, 235 in the direction of arrow 32, the raised part 301 (Fig. 19) of the cam 235 of the control clutch 233, 234, 235 engages the arm 302 of the lever 303 moving it clockwise around the pivot screw 305 against the action of its spring 304.

The lever 300 participates in this movement so that, owing to the previously established driving connection 296, 299 and the slide 296, also the swing frame 306 is moved clockwise around its pivot bolts 307 and 308. During the swing movement the angle levers 310 of the figures "0 to 9" which are mounted to swing on the shaft 309 of the swing frame are lifted upwards (in Fig. 22 only the angle lever 310 connected with the figure "5" is shown).

As described under the heading "Formation of values", the lug 218a corresponding to the figure "5" of the shaft 217 was arrested during its clockwise movement in the setting position shown in Fig. 22 by the opposite raised slide 275 of the figure "5" and therefore the angle lever 310 corresponding to the figure "5" strikes the lug 218a by its arm 311 immediately at the beginning of the movement of the swing frame 306. Consequently this angle lever 310 is moved anti-clockwise around the shaft 309 by the continued movement of the swing frame 306, 309, and simultaneously moves the draw bar 312 in the direction of arrow 170. The draw bar 312 also moves the intermediary lever 57 clockwise around its pivot 57a and simultaneously the type lever 58 with the type "5" is made to print in known manner on the sheet in front of the printing roller of the paper carriage 5. The carriage is shifted as usual as soon as the type lever 58 falls back into place and simultaneously the catch roller 241 (Fig. 23) is shifted one decimal place further towards the right on the shaft 238 through the

known system of connecting rods, so that it will mesh with the next wheel of the multiplicand mechanism 242.

The paper carriage shift is supported in its movement by a device according to Patent 2,141,158 since meanwhile the turning of the control clutches 29, 30, 31 (Fig. 18) and 233, 234, 235 in the direction of arrow 32 has progressed sufficiently so that the raised part of cam 31 (Fig. 4) of the control clutch 29, 30, 31 bears upon the roller 222 of the shaft 195 of the swing frame 197.

Consequently, the swing frame 197 is moved clockwise around the supporting shaft 196 and the paper carriage shift towards the left is accelerated, as described in the above mentioned patent.

It should be noticed that now the clutch 239, 240 (Fig. 23) located between the shaft 217 and the shaft 238 in dependence of the turning of the control clutch 233, 234, 235 is suitably re-opened.

During the movement of the swing frame 197, its shaft 195 sliding downwards in the longitudinal slot 198 (14, 16 and 17) of the supporting member 185 once more with its lug 194 engages the lug 193 of the slide 160 and thereby cooperates with the members 180, 183, 186, 188, 224, as described under the heading "Introduction of value formation", without however, moving any other parts. When the shaft 195 moves still further downwards in the slot 198 of the supporting member 185 until it has reached the position shown in Fig. 17, which causes further anti-clockwise movement of the members 180, 183, 186 and 188 as well as clockwise movement of the locking lever 224, an abutted edge 313 of the slide 180 will run off the rounded front edge 314 of a square lug 315 of a guide member 317 which has been bolted to the supporting member 185 by screws 316. In this way the slide 180 and through the nose 179 lying up against the rear edge 178 of the slide 174, also the last named member is moved against the spring 176 against the direction of arrow 170. The lug 193 of the slide 180 gets out of the pathway of the lug 194 of the shaft 195 so that the members 180, 183, 186, 188 can swing back clockwise by the action of the spring 190 and the lever 224 can swing back anti-clockwise by the action of the spring 225 into the position shown in Fig. 17, in which the upper edge of the member 183 again lies close against the stop pin 192. As soon as the bevelled edge 313 of the slide 180 leaves the front edge 314 of the guide member 317, the slides 180 and 174 are again moved in the direction of arrow 170 by the spring 176 until the lug 193 of the slide 180 strikes against the front edge 194a of the lug 194 of the shaft 195.

Restoring the various devices in operation to their initial position

The lever 318 (Figs. 2 and 19) mounted on the left end of the shaft 195 is put into operation simultaneously with the downward movement of the shaft 195 of the swing frame 197 in the longitudinal slot 198 of the supporting member 185. Consequently the rocking device 319 is moved clockwise around its pivot screw 320 and with its bevelled edge 321 bears upon the lower edge 322 of the slide 323, moving the latter upwards against the spring 324. Simultaneously the catch pawl 261 is moved clockwise against the spring 327 owing to the driving connection 325, 326 and the obstructing lug releases the lever 253 again so that the latter as well as the members 250, 282,

254, 255 connected therewith can return into their initial position owing to the tension of the spring 253a.

The raised part 328 (Fig. 22) of the cam 235 of the control clutch 233, 234, 235 again releases the arm 302 of lever 303 during the present and subsequent turning of the control clutch 29, 30, 31 of the figure "5" as well as of the control clutch 233, 234, 235, whereupon the lever 303 and the members 300, 306, 309, 310 swing back into their initial position.

The raised part of the cam 234 of the control clutch 233, 234, 235 simultaneously bears upon the unlocking slide 244 and moves it upwards again, allowing the teeth 278 of the ratchet (Fig. 21) of the zero setting slide 260 to pass by the catch pawl 267. In consequence of this upward movement of the unlocking slide 244, its pin 290 again releases the arm 291 (Fig. 22) of the lever 292, allowing the latter together with the slide 296 to be restored to their position of rest by the action of the spring 297.

The unlocking slide 244 during its upward movement also returns the zero setting slide 260 into zero position through the members 329 (Fig. 19), 330, 331 and also the gears 272, 273, 274, 275 as well as the shaft 217 against the spring 276. It may be noticed that the shaft 239 (Fig. 23) of the multiplying mechanism is not altered in any way since, as mentioned before, the clutch 239, 240 was opened between the two shafts 217 and 238. Meanwhile also the raised part 328 (Fig. 19) of the cam 235 of the control clutch 233, 234, 235 has been moved within reach of the opposite roller 332 of the shaft 195 of the swing frame 197 which at this point is still held in swung-out position by the raised part 31a (Fig. 18) of the cam 31 of the control clutch 29, 30, 31 of the figure "5." With the continued turning of the two control clutches 29, 30, 31 and 233, 234, 235 at first the raised part 319 of the cam 31 releases the roller 222 of the shaft 185 of the swing frame 197 and shortly thereafter also the raised part 328 of the cam 235 releases the roller 332 of the shaft 195 of the swing frame 197, whereupon the latter returns into its position of rest. Simultaneously its shaft 195 (Fig. 17) slides upwards in the longitudinal slot 198 of the supporting member 185 from the position shown in Fig. 17 into the position shown in Fig. 14, so that the front edge 194a of the lug 184 of the shaft 195 again releases the lug 183 of the slide 180 allowing the slides 180 and 174 to return completely into their position as shown in Fig. 14 by the action of spring 176.

Following the upward movement of the shaft 195 of the swing frame 197 in the longitudinal slot 198 of the supporting member 185, the members 316 (Fig. 19) 319, 323 and 261 are also moved into their position of rest by the action of springs 324 and 327. Meanwhile the control clutch 29, 30, 31 of the figure "5" has completed a full turn so that it is separated from the driving shaft 33 in known manner and the levers 26, 27 of the figure "5" return from the depressed position as shown in Fig. 4 into the position of rest as shown in Fig. 3. Simultaneously the members 202 and 211 of the figure "5" are returned into their normal position.

Shortly thereafter the control clutch 233, 234, 235 also completes a full turn during which the clutch pawl 233, Fig. 18, is brought out of reach of the clutch gear 237 by the lug 232 striking against the arm 231 of the catch lever 224 against the action of the pressure spring 236, so that

also this control clutch 233, 234, 235 is brought to a standstill.

Now the remaining values of the multiplicand are introduced by depressing the respective calculating key 10. The above described operations are repeated in this transaction during which, as will be understood, the respective means (Fig. 19) must be moved through a distance corresponding to the introduced value. When striking the calculating key 10 corresponding to zero, however, these value forming means remain in their position of rest.

The following should be noted: If in that moment in which the depressed calculating key 26 corresponding to the figure "5" is returned into rest position (Fig. 3) the calculating key of another figure is also depressed, say for instance, the calculating key 10 corresponding to the figure "1," the slide 211 corresponding to the figure "1" is raised in the direction of arrow 220 by the member 202 (Fig. 18) before the shaft 217 with the lugs 218 during its return movement anti-clockwise has reached its position of rest, which means that the total-taking clutch 233, 234, 235 has been arrested. During this anti-clockwise turn of the shaft 217, the lug 218 corresponding to the figure 1 in this case bears upon the decline 211a of the raised slide 211 of the figure "1" causing it to escape downwards in the opposite direction of arrow 228.

Owing to the driving connection 210, 209, the bar 202 tends to move somewhat anti-clockwise around the screw 201 against the action of the spring 207 so that the bar 202 slides downwards in its slot 204 of the ledge 205. As the shaft 217 continues to be turned back anti-clockwise, the lug corresponding to the figure "1" releases the slide 211, whereupon the members 211 and 202 return instantly into their set position by the action of spring 207, as shown in Fig. 4. It be further mentioned, that when the single calculating keys 10 are struck in rapid succession, the total-taking clutch 233, 234, 235 (Fig. 18) is not first separated from the driving shaft 33 for the reason that the pawl 224 which arrests the total-taking clutch 233, 234, 235 in dependence of the respective control clutch 29, 30, 31 connected with the driving shaft 33, when depressing a calculating key 10 already is moved by the members 221, 222, 195, 194, 193, 180, 183,

186, 188 into the position shown in Fig. 16, as soon as the total-taking clutch 233, 234, 235 has completed a full turn. For this reason the clutch pawl 233 of the clutch 234, 235 keeps in mesh with the clutch gear 237 so that the clutch 233, 234, 235 remains connected for another full turn.

Now the corresponding tabulation key 13, Fig. 1, is depressed for introducing the multiplier, which causes the paper carriage 5 as well as the catch wheel 241 (Fig. 23) to be set into the chosen decimal place of the column totalizer accumulating the multiplier and also of the multiplying mechanism. Then the respective calculating keys 10 of the multiplier value are depressed so as to introduce the multiplier into the multiplier device 243 of the multiplying mechanism as well as into the respective column totalizer, as described above. Now the key 15 (Fig. 1) is depressed to form the end-product, whilst the locking mechanism 139, 141 is released again in a suitable manner through the lug 135a (Fig. 14) of the catch pawl 135 of the lever 125. In this way the members 125, 145 (Fig. 12), 147 151, 157, 161, 162 and 174 (Fig. 10) 138, as well as 123, 117 are returned to their position of rest (see Figs. 5, 10 and 13).

When the end-product key 15 is depressed the end-product is calculated by the multiplying mechanism of the type-writing-calculating machine and subsequently by total taking same is printed automatically on the paper kept in motion by the paper roller. At the end of the product total-taking the catch lever 107 (Fig. 10) is moved forcibly in the opposite direction of arrow 111 against the action of spring 110. Thereby the lug 106 of the catch lever 107 again releases the lug 105 of the slide 100, whereupon the slide 100 and the members 89, 86, 83, 81 and 75 are returned to their normal position, as shown in Figs. 5, 7, 9 and 10, by the action of spring 78, whilst owing to the lug 113 of the slide 180 bearing upon the edge 114a of the pawl 115, the latter tends to move out of the way against its spring 118. The machine is then ready again for normal figuring, that is, for additive and subtractive figuring as well as for total-taking from the column totalizers.

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