PUBLISHED

MAY 25, 1943.

BY A. P. C.

R. ANSCHUTZ

TOTAL-TAKING MECHANISM FOR AUTOMATIC CLEAR WRITING OF TOTALIZING MECHANISM

Filed June 7, 1937

Serial No. 146,897

26 Sheets-Sheet 1

Fig. 1

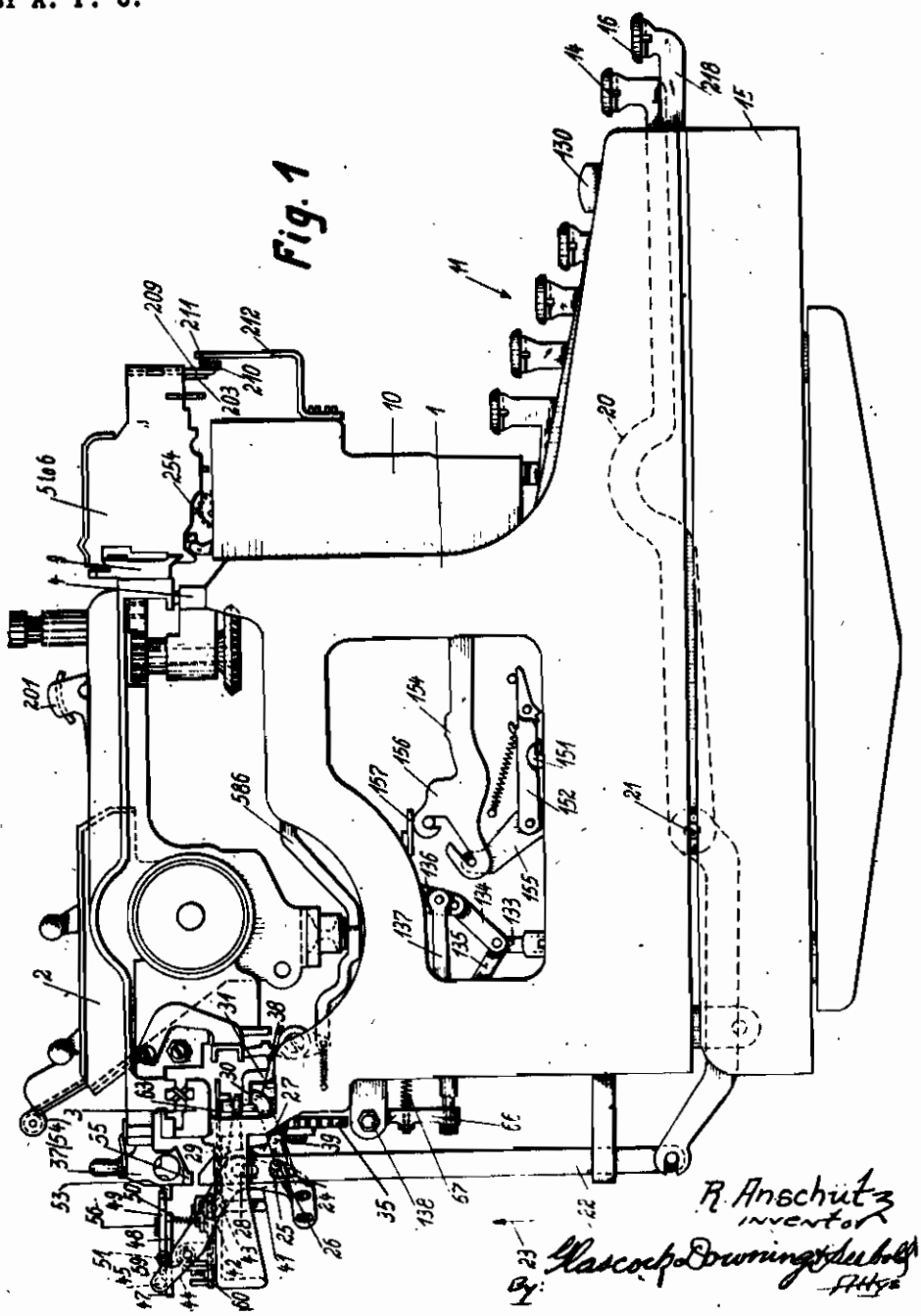

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Fig. 2

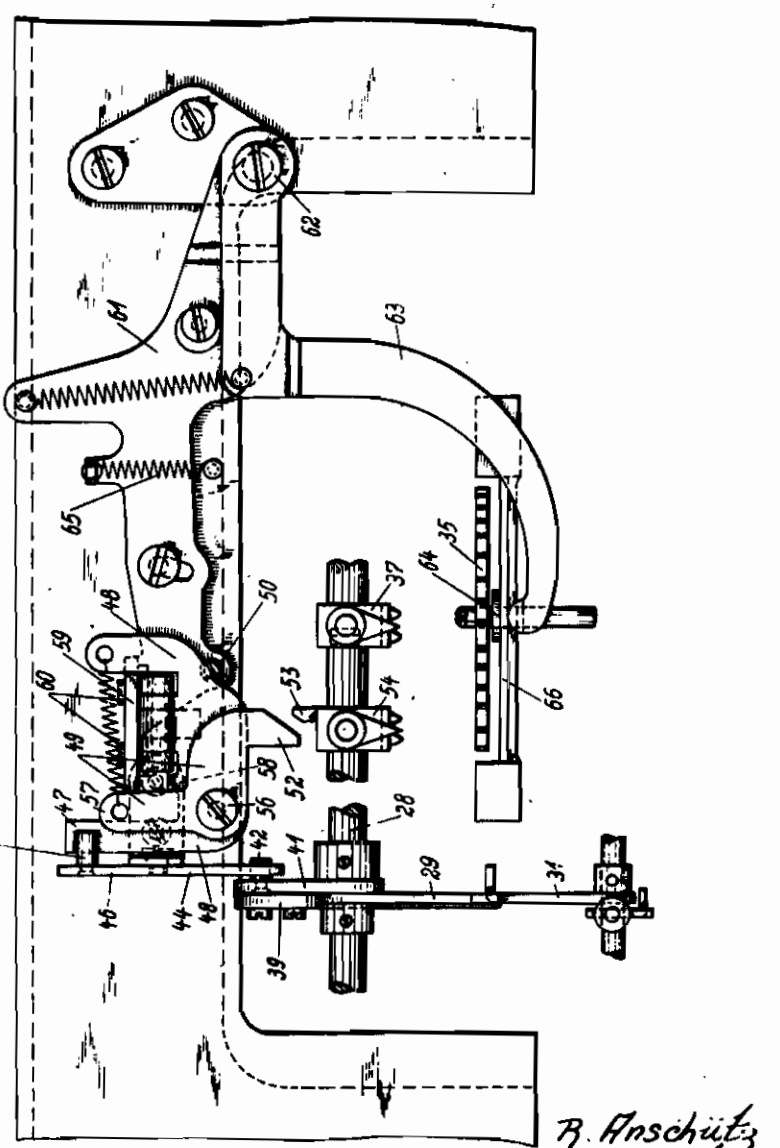

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Fig. 3

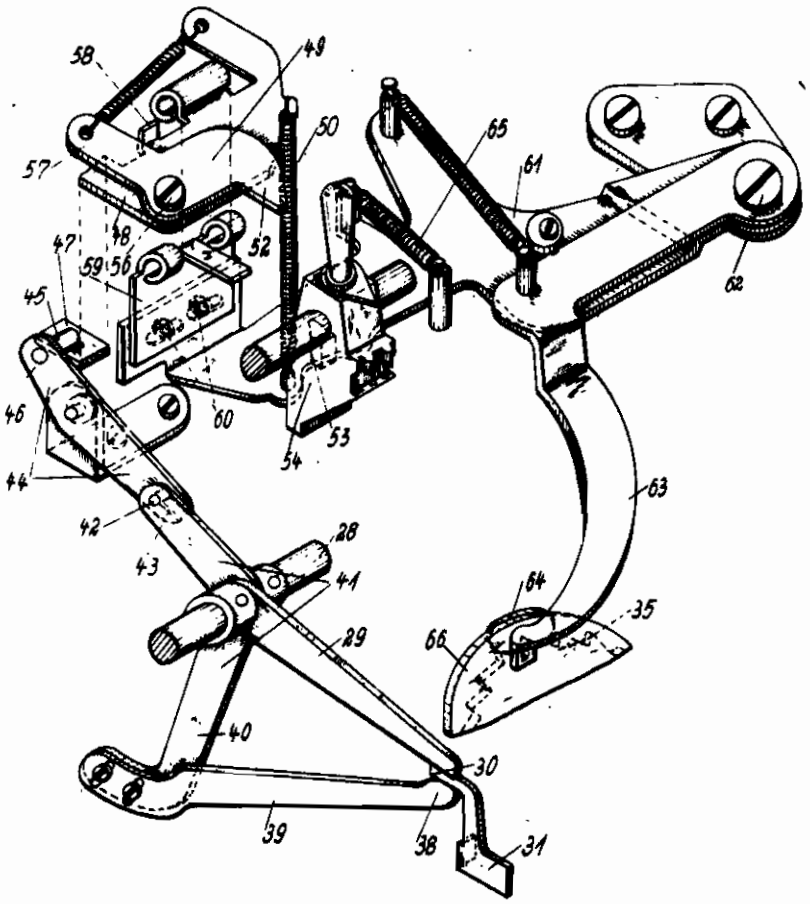

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Fig. 4

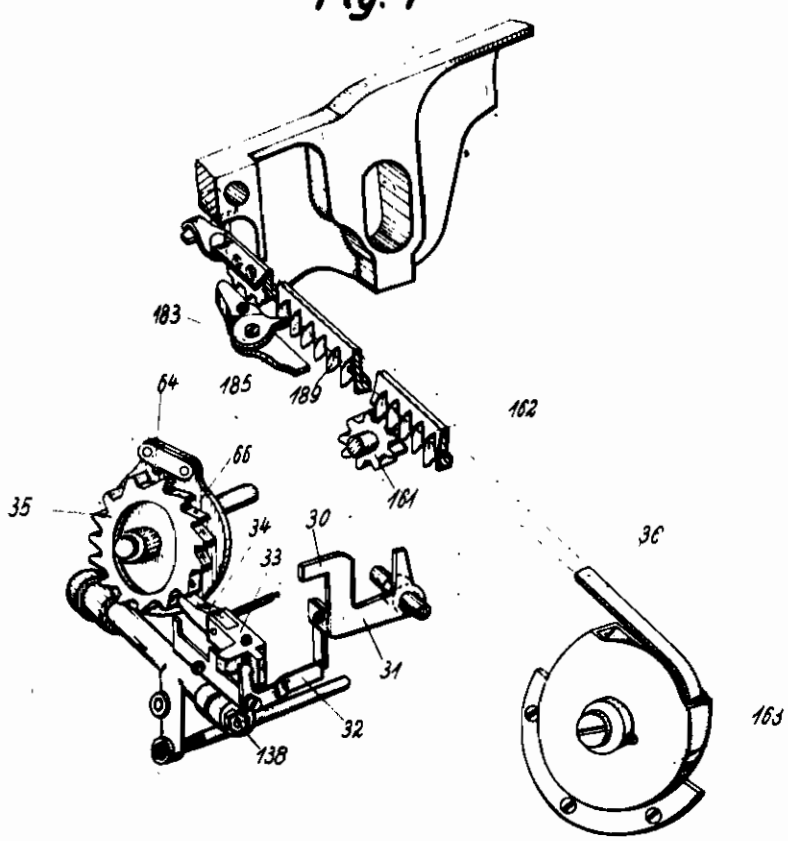

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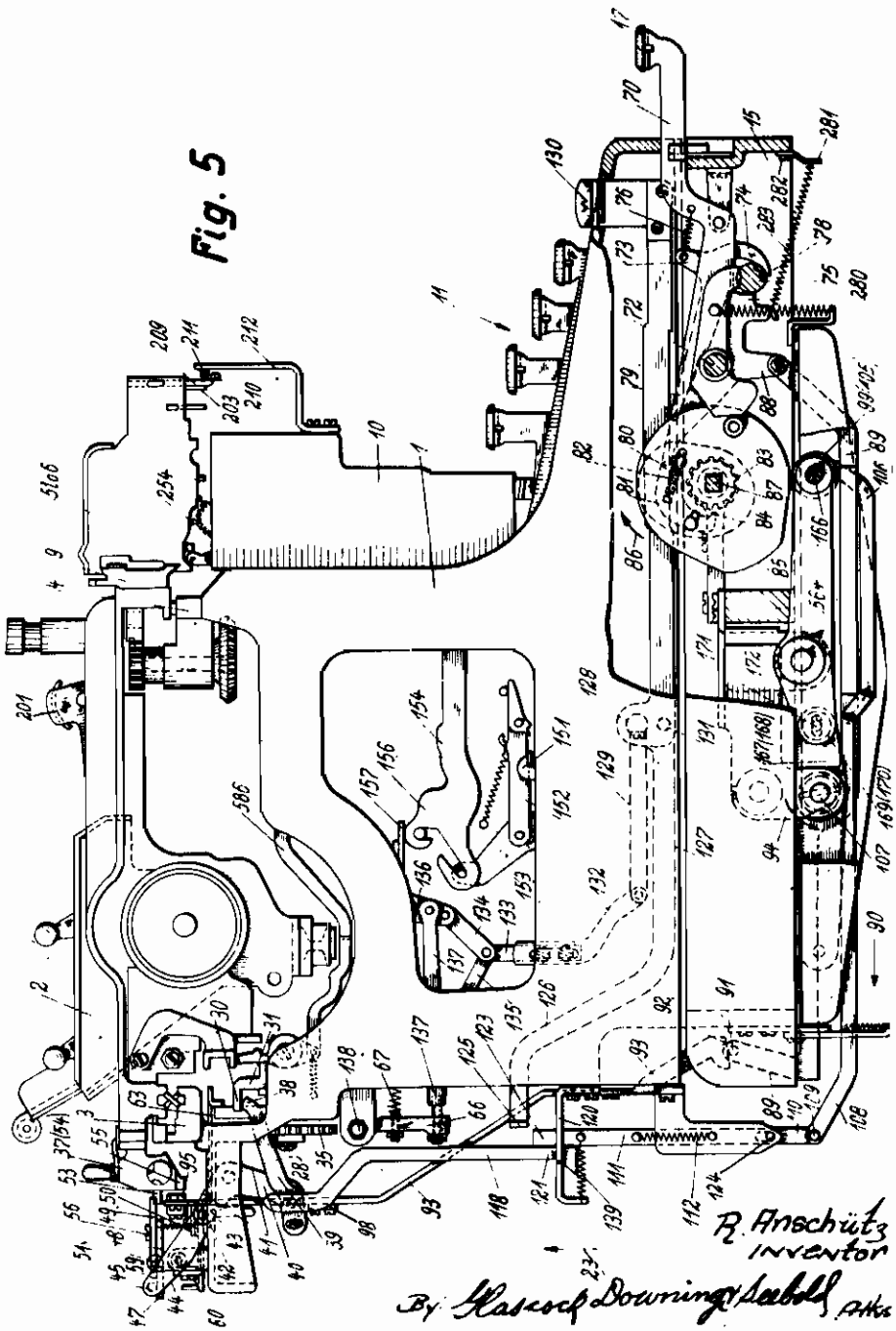
Fig. 5



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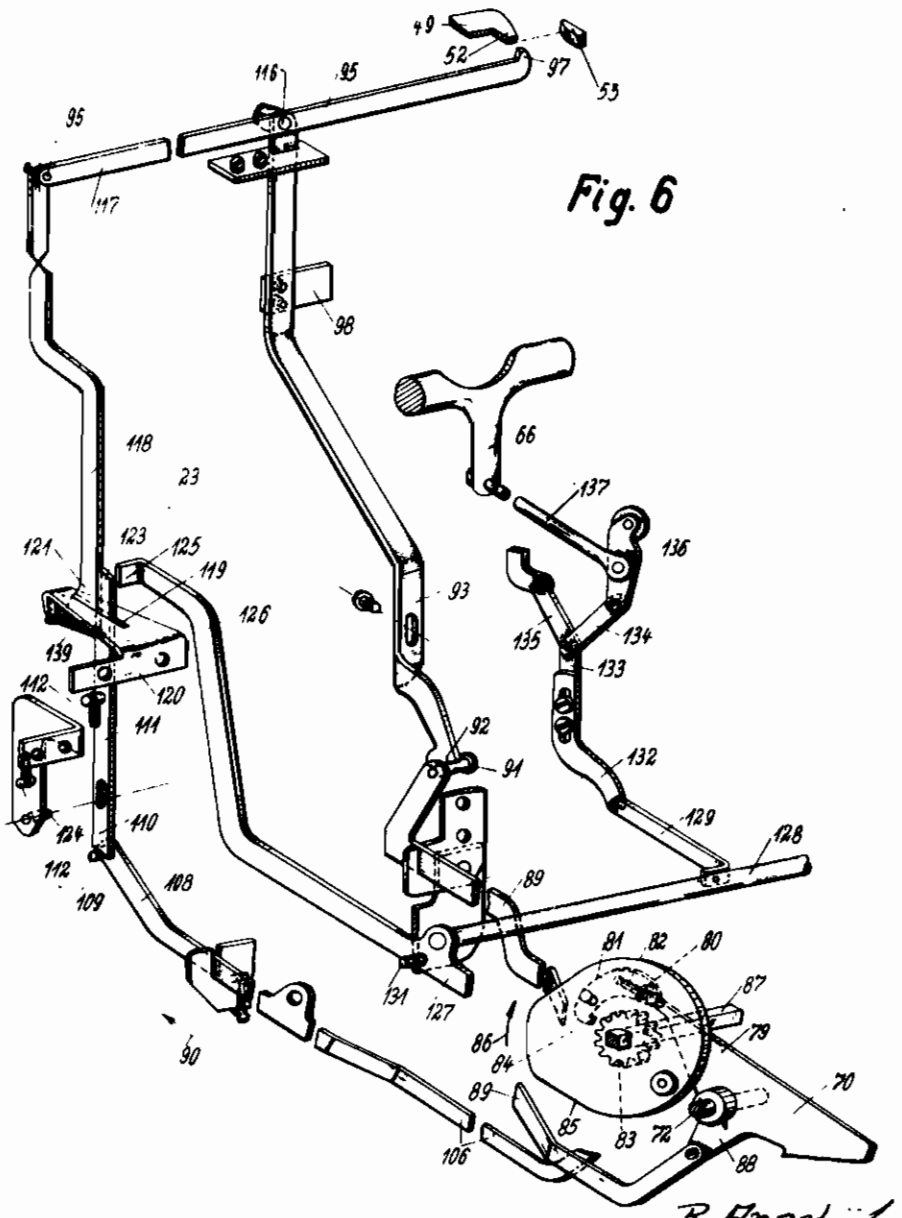

Fig. 6

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Fig. 7

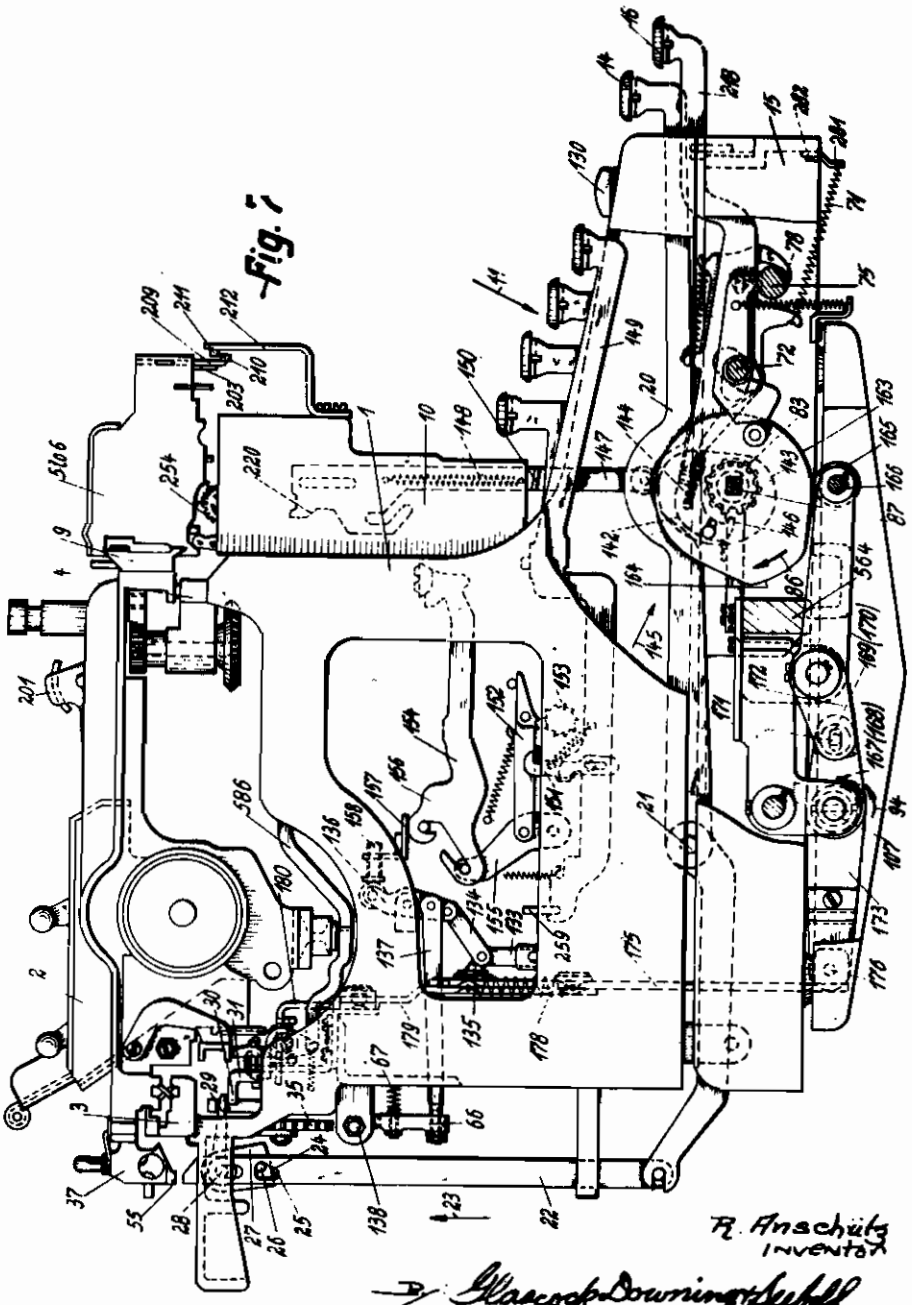

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Fig. 8

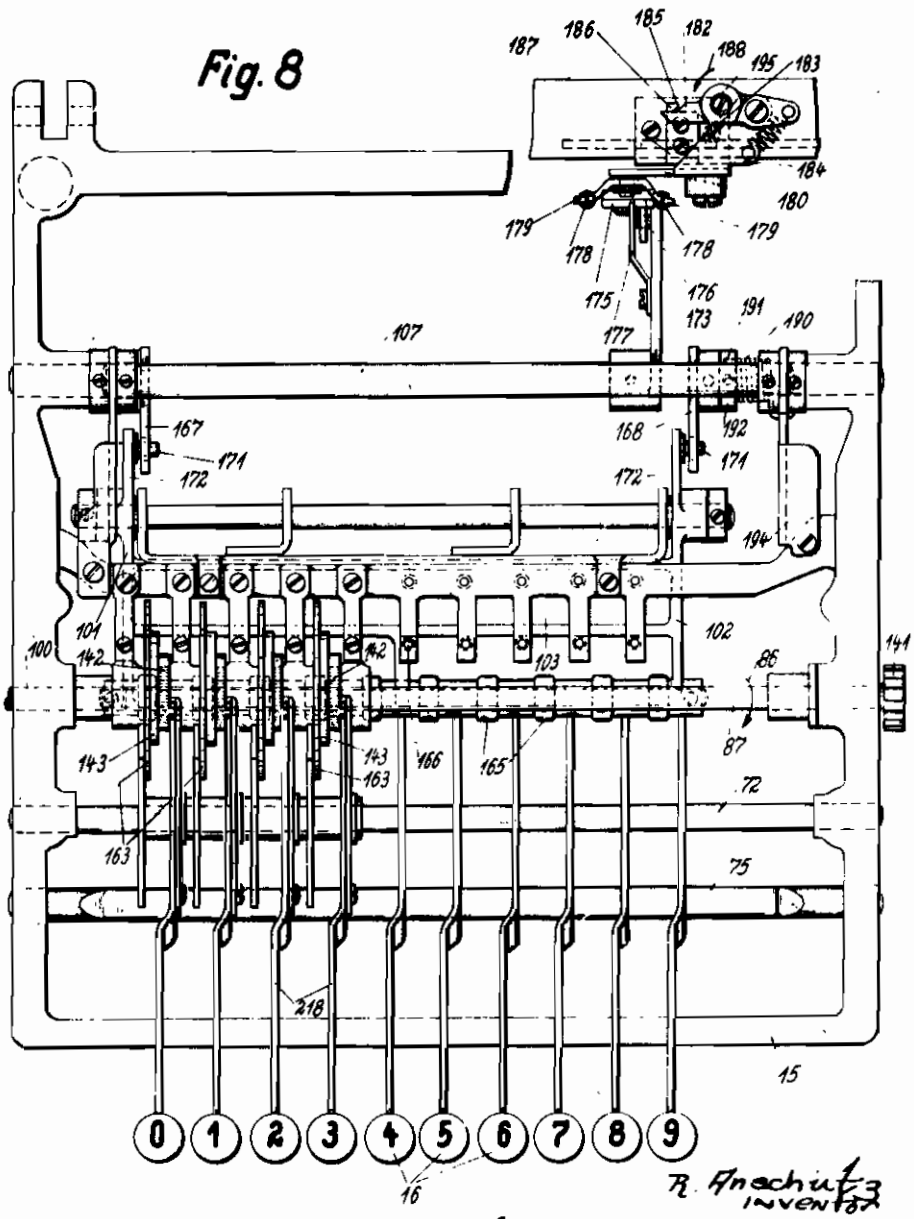

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Fig. 9

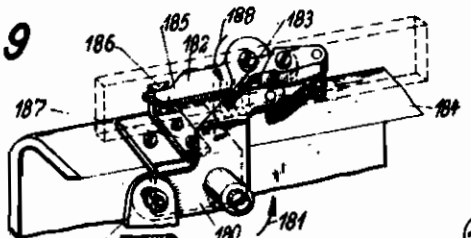


Fig. 10

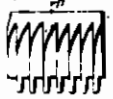
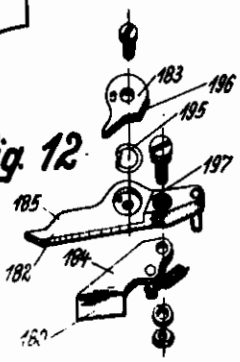
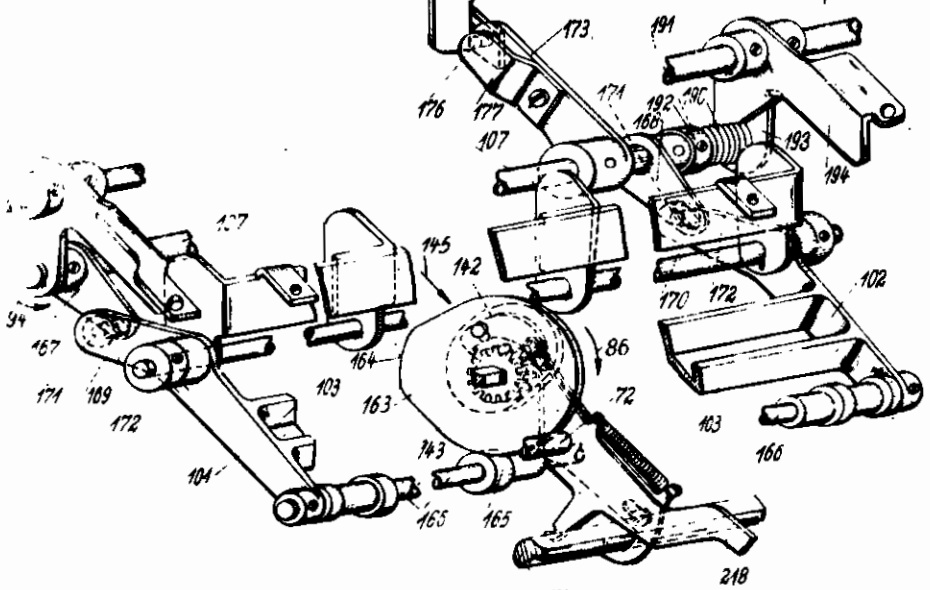


Fig. 11

Fig. 12





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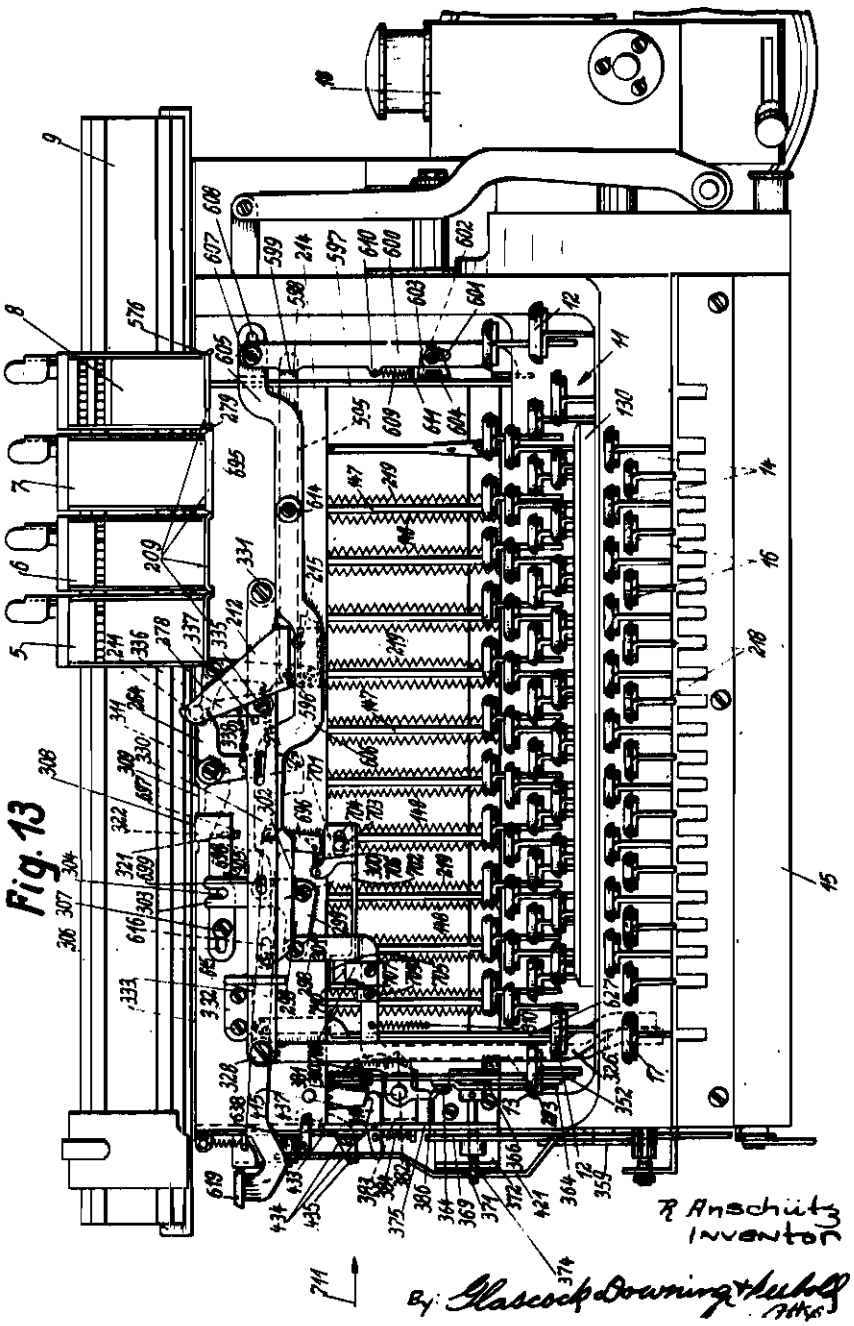

Fig. 13

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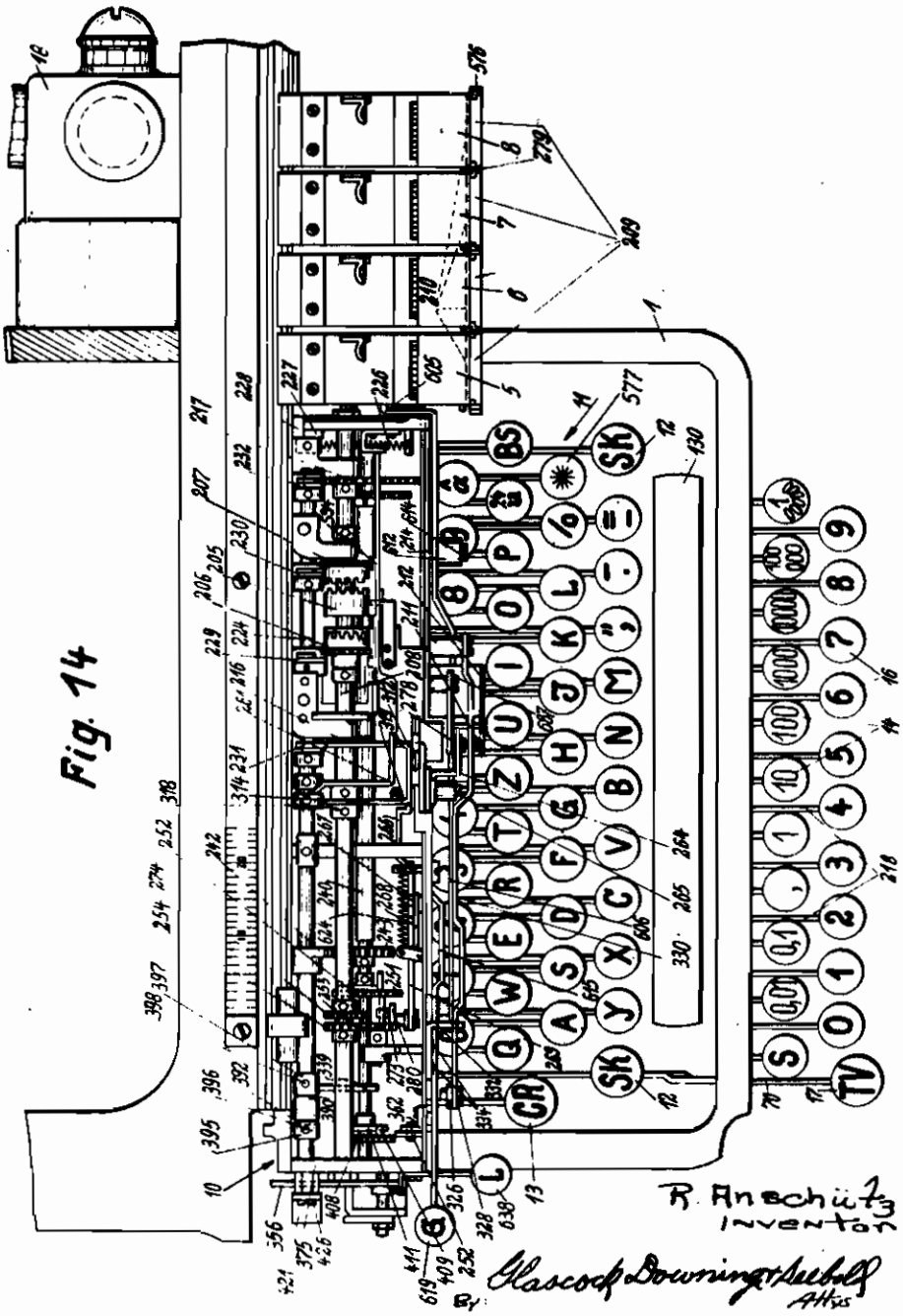

Fig. 14

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Fig. 15

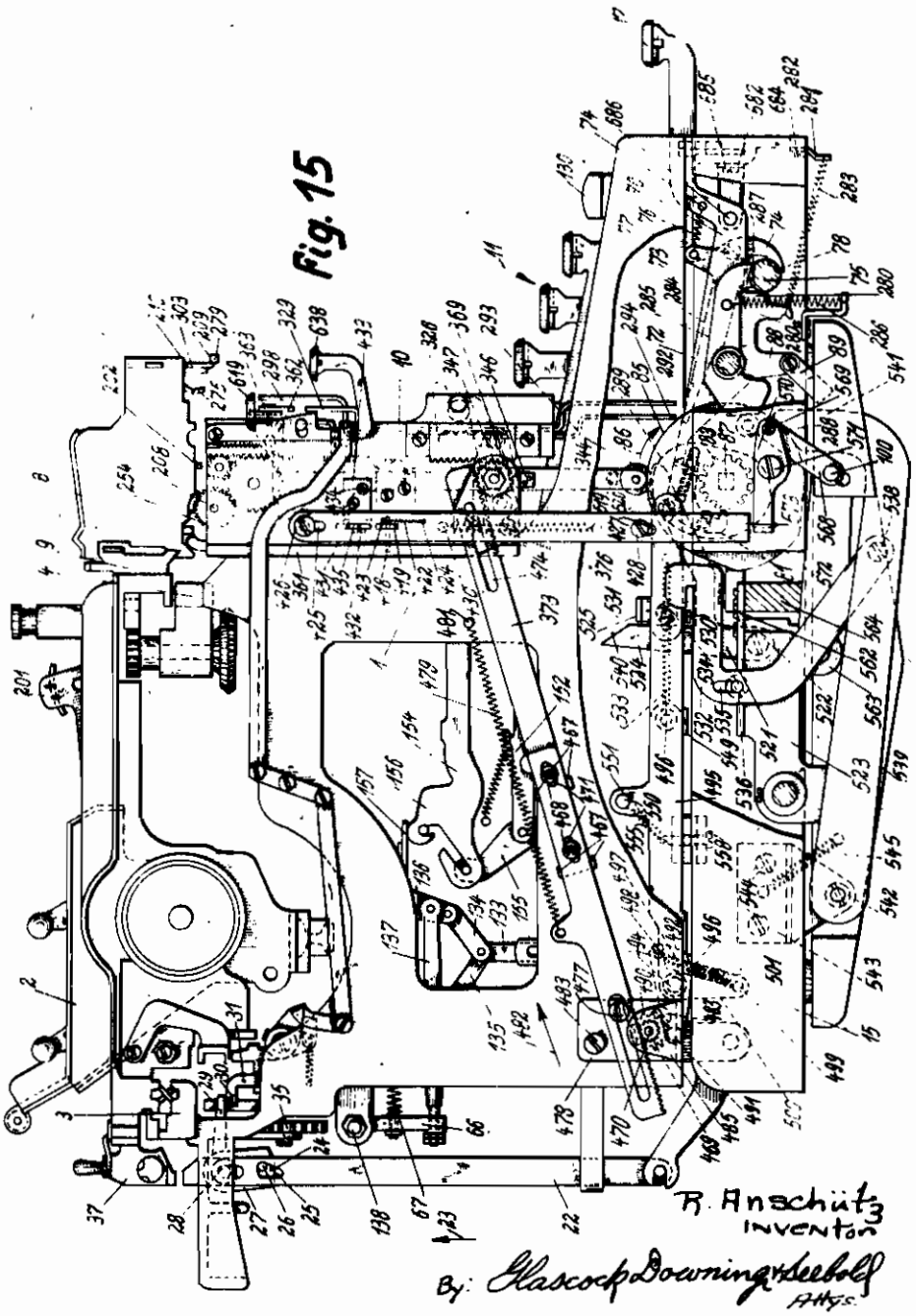

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Fig. 16

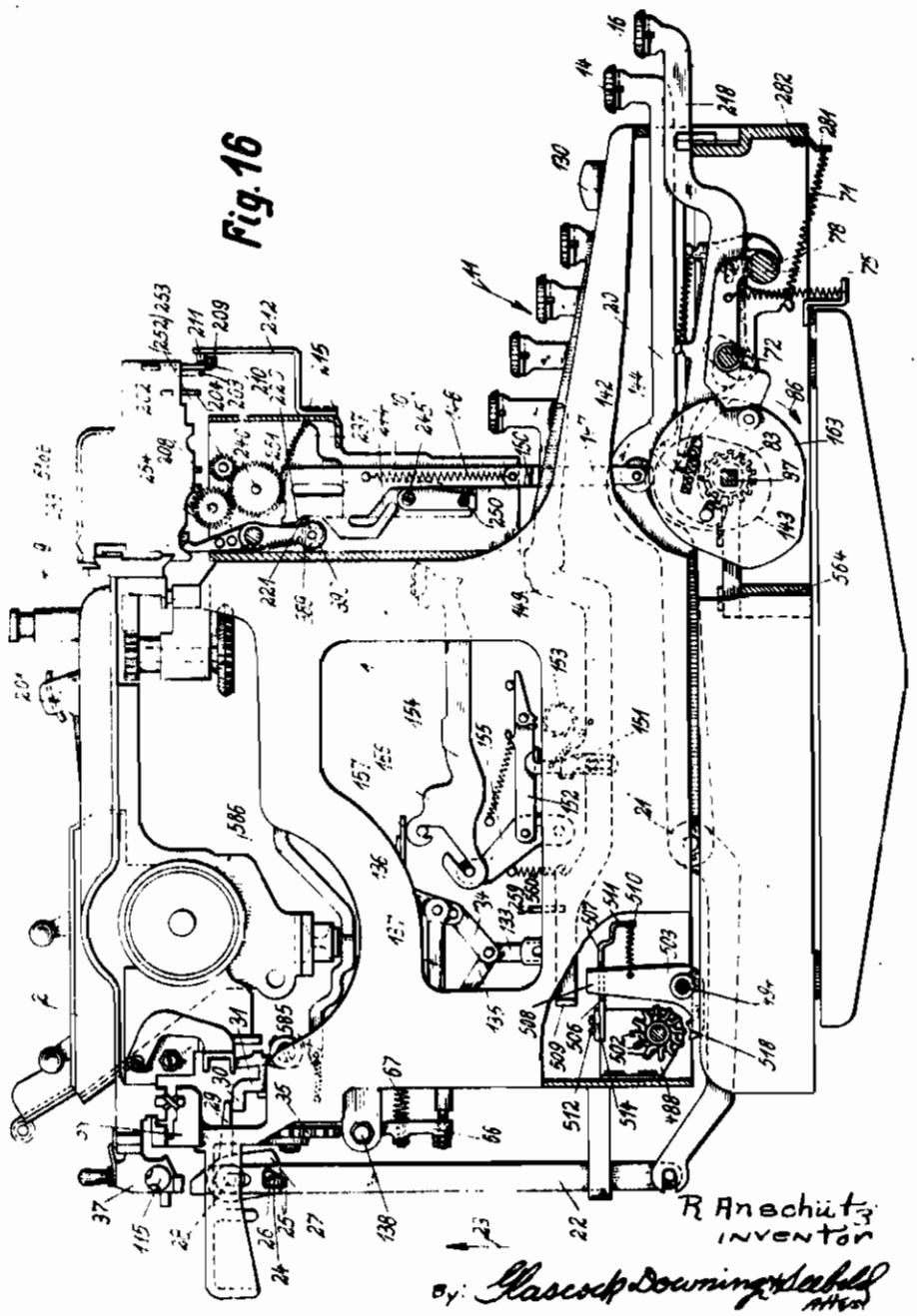

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Fig. 17

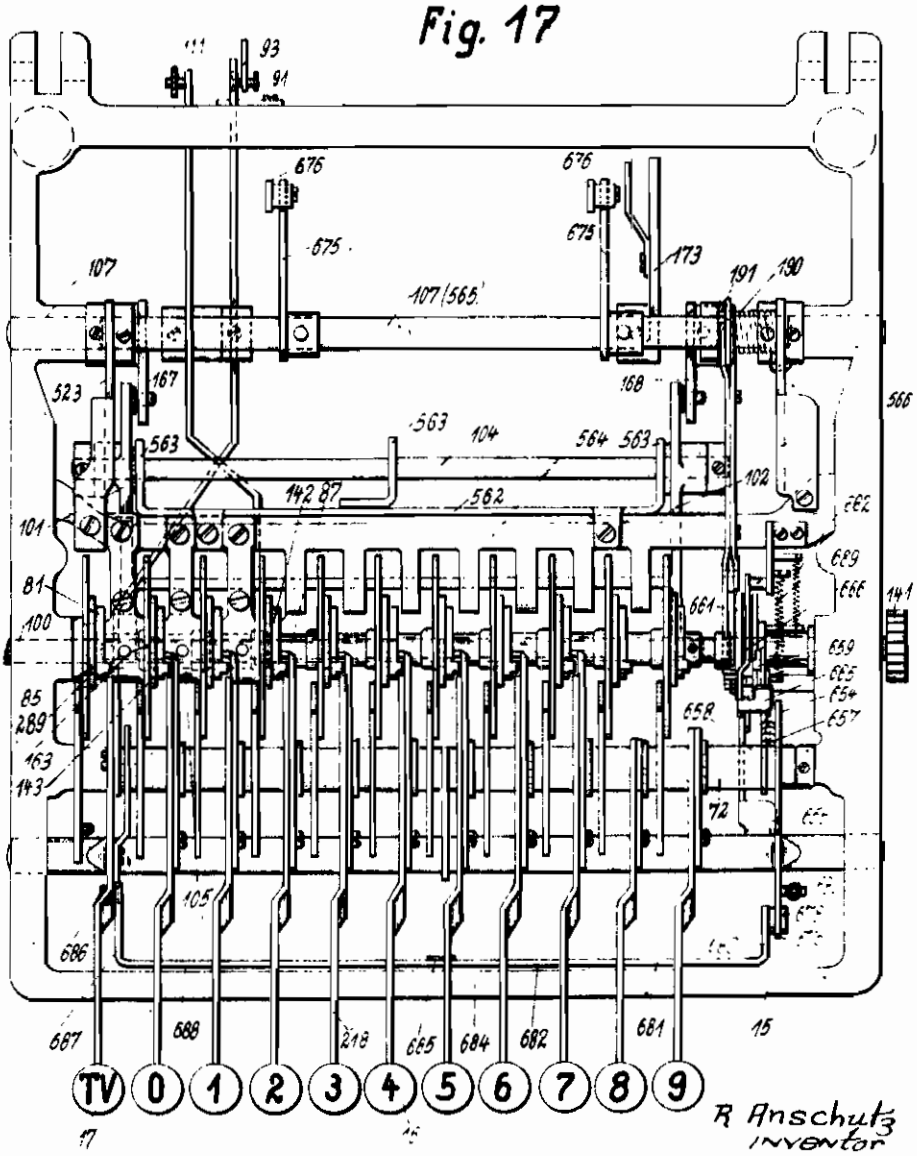

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Fig. 18

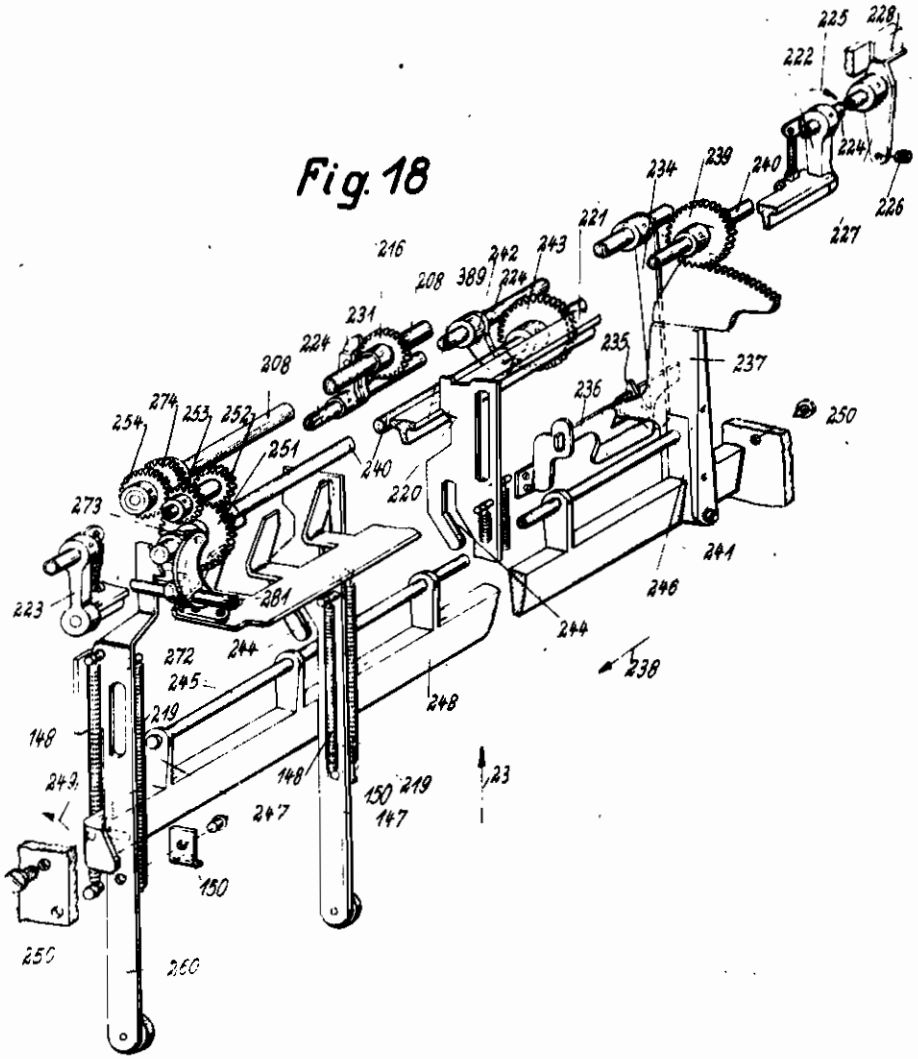

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Fig. 19

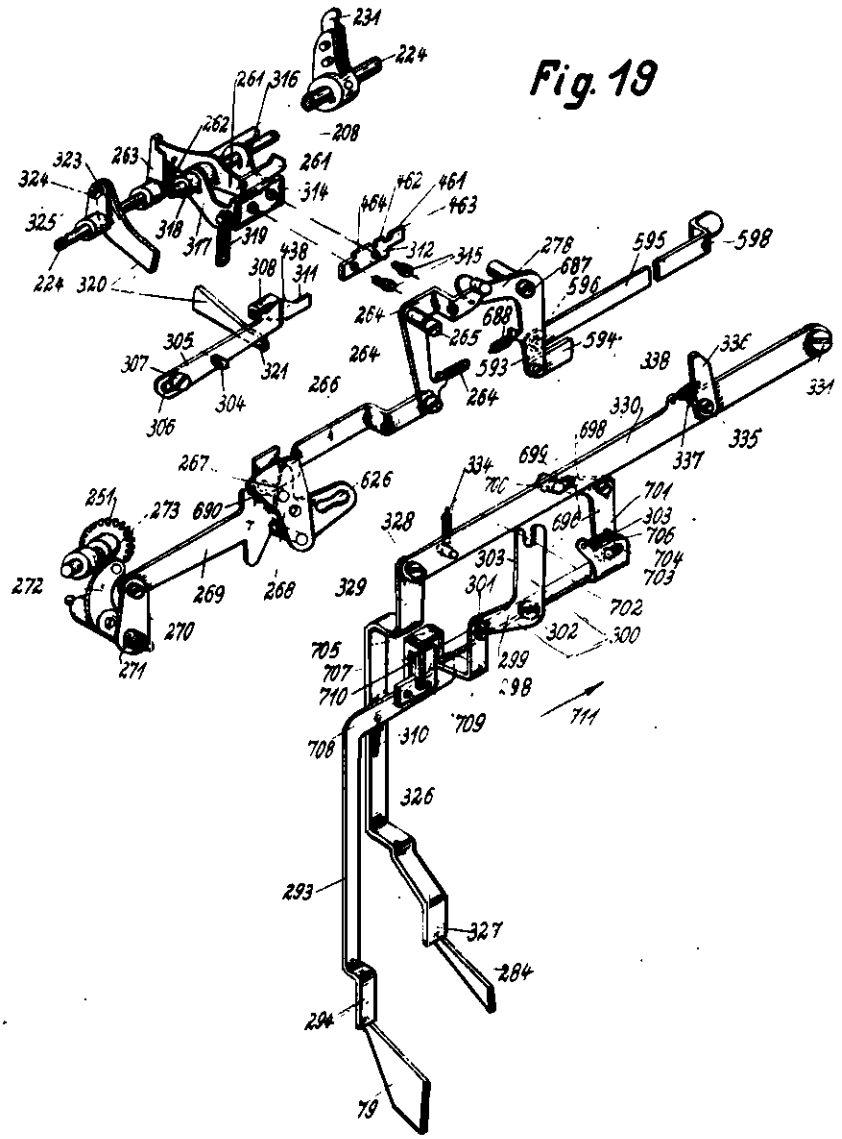

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Fig. 20

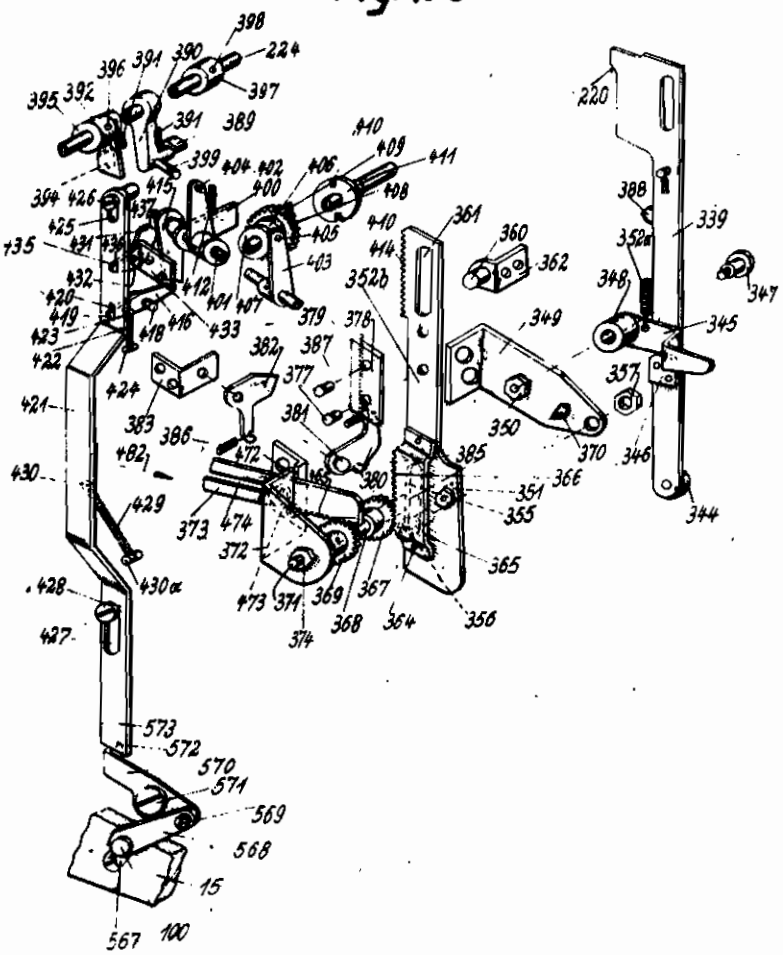

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Fig. 21

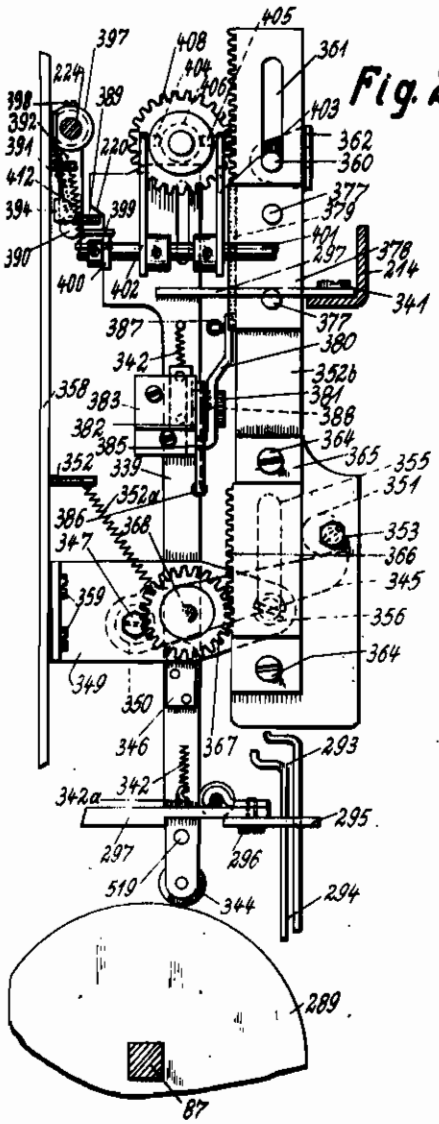

Fig. 22

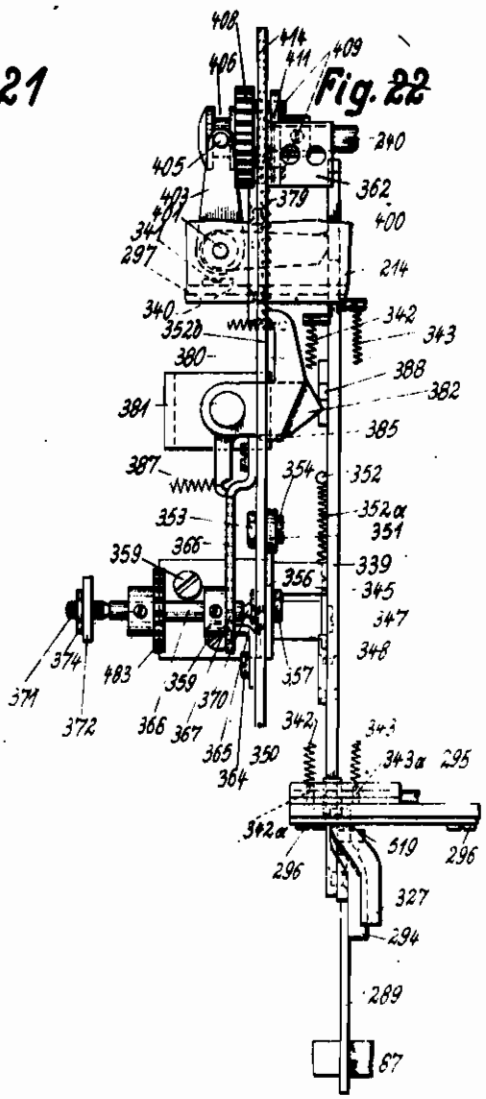

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Fig. 23

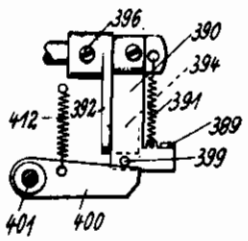

Fig. 24

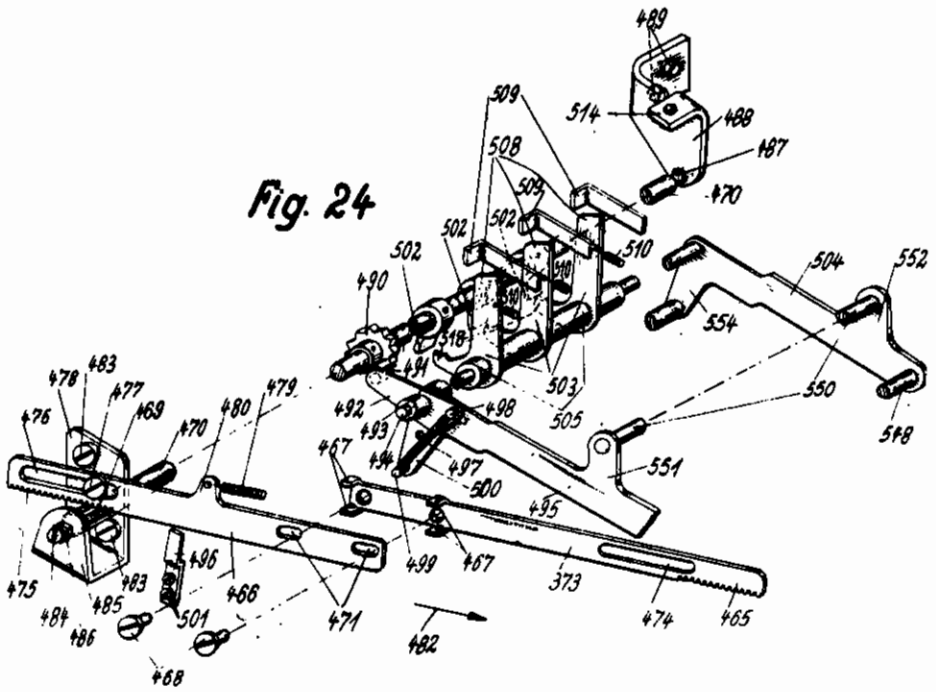

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Fig. 25

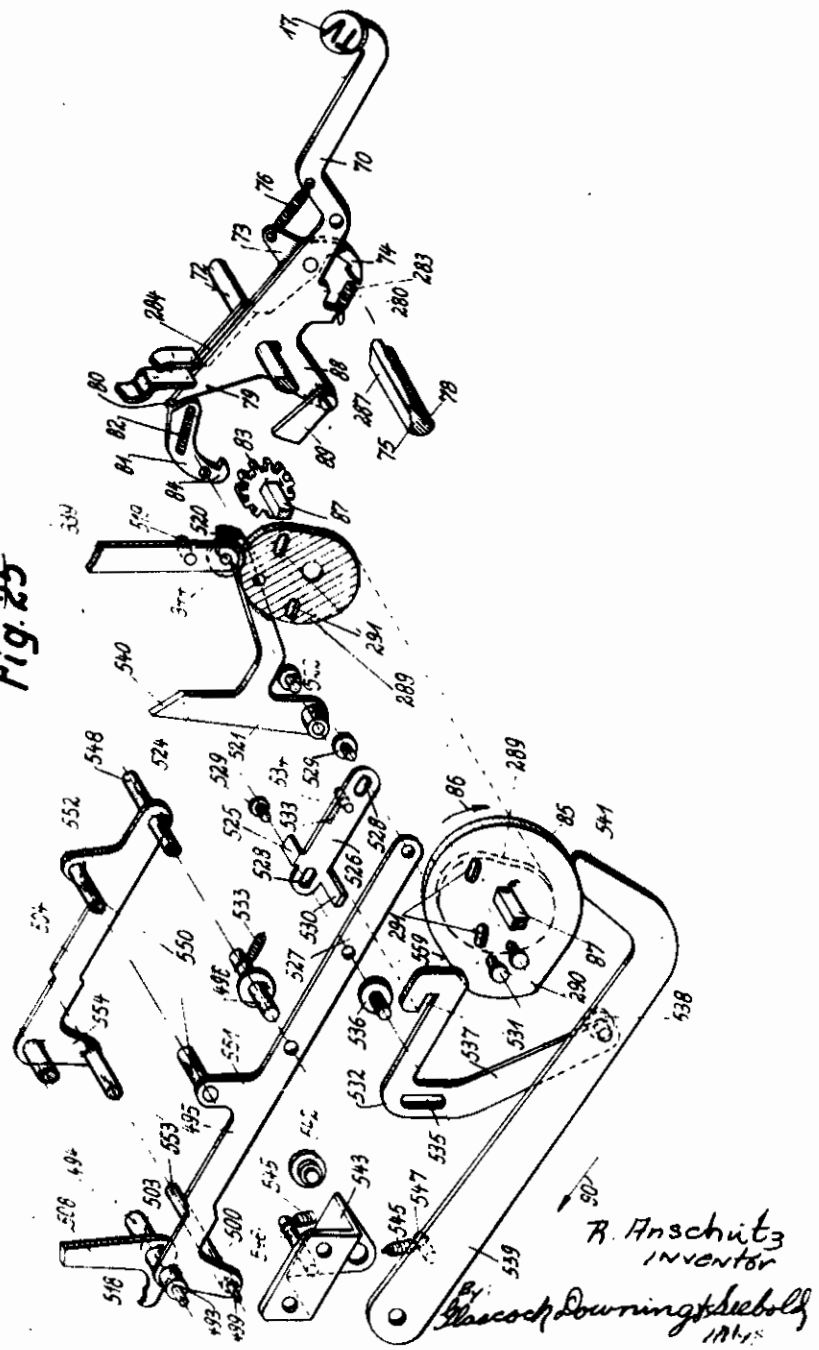

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Fig. 26

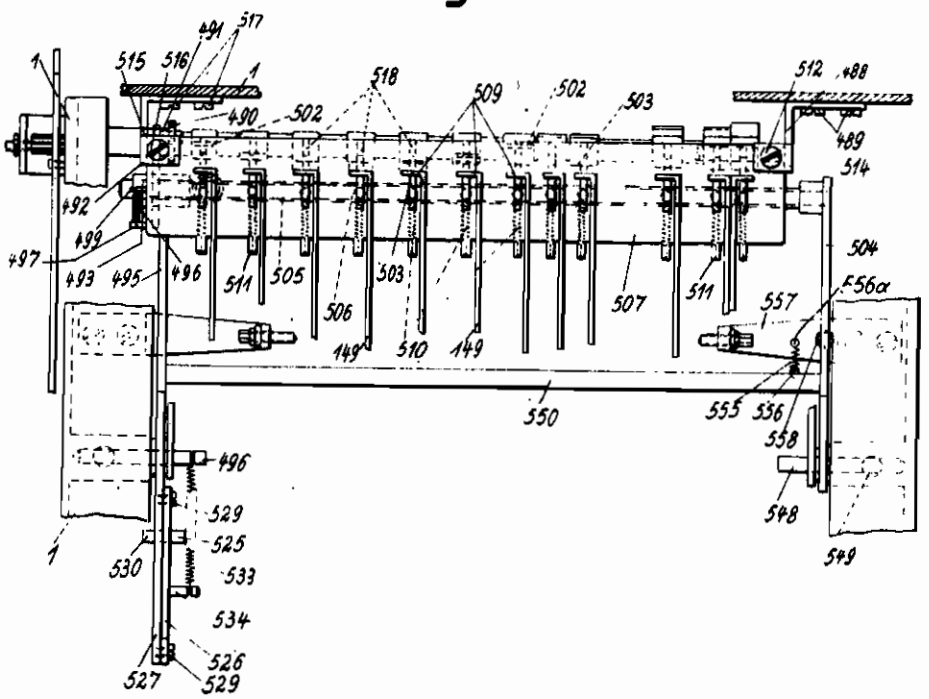

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Fig. 27

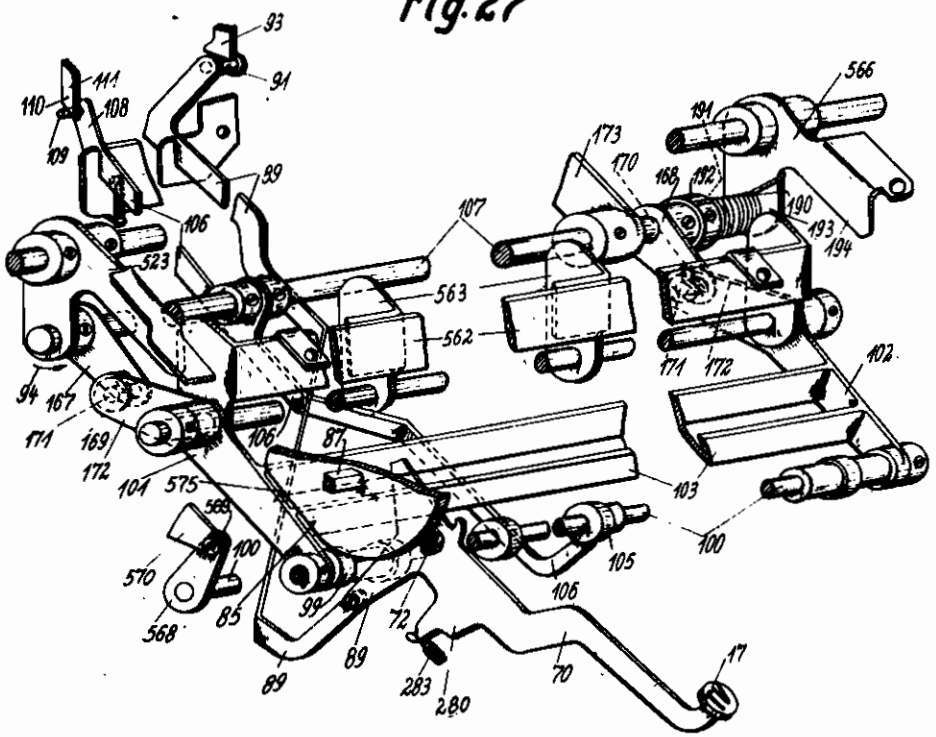

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Fig. 28

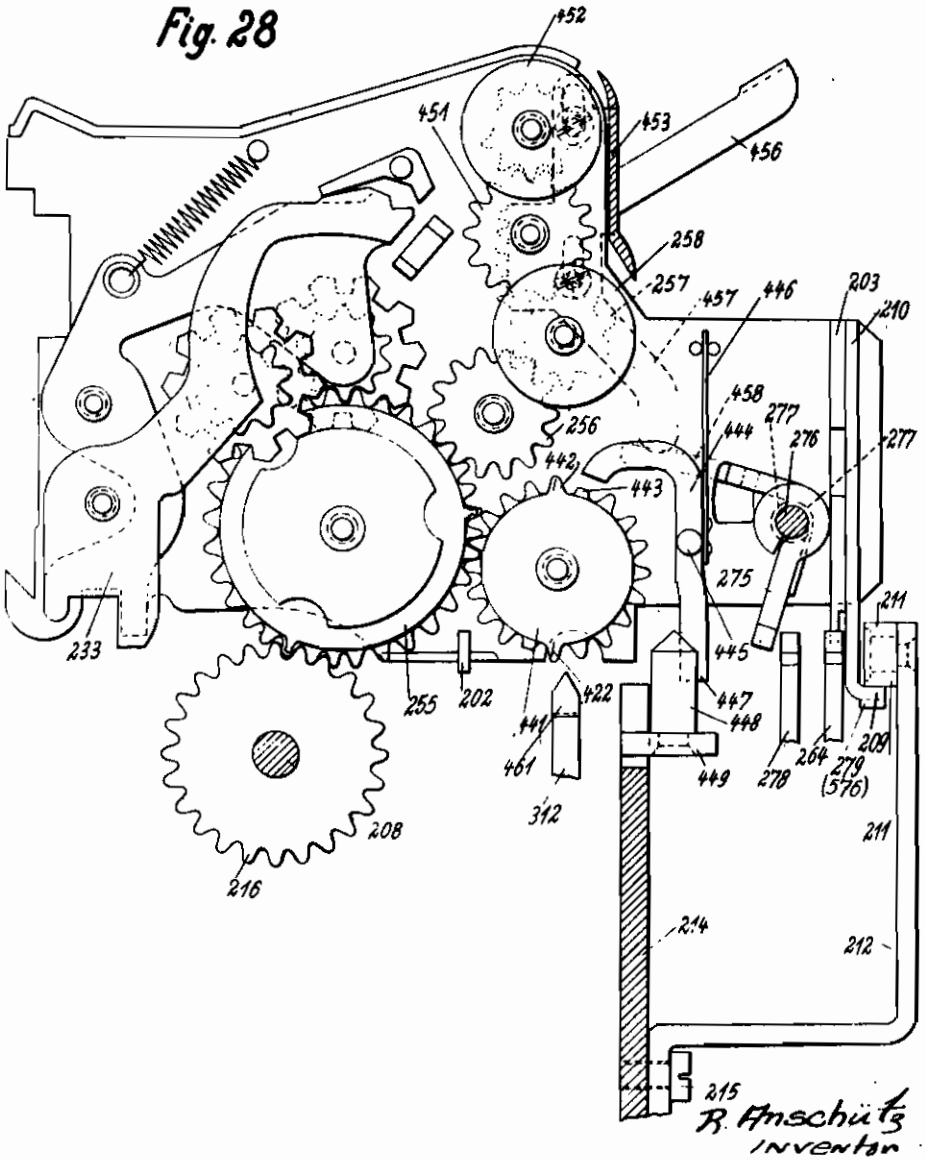

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Fig. 29

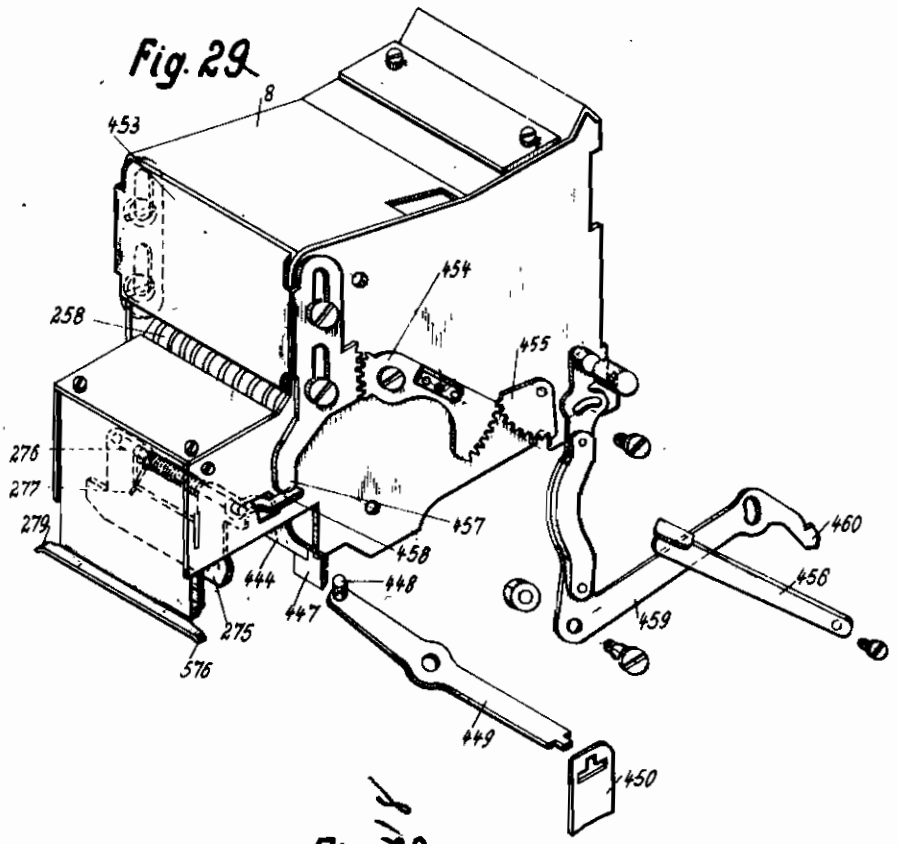

Fig. 32

200

I	II	III	IV
Soll	Haben	Alter Saldo	Neuer Saldo
153.42		264.53	417.95
	720.80	417.95	302.85
520.60		302.85	217.75

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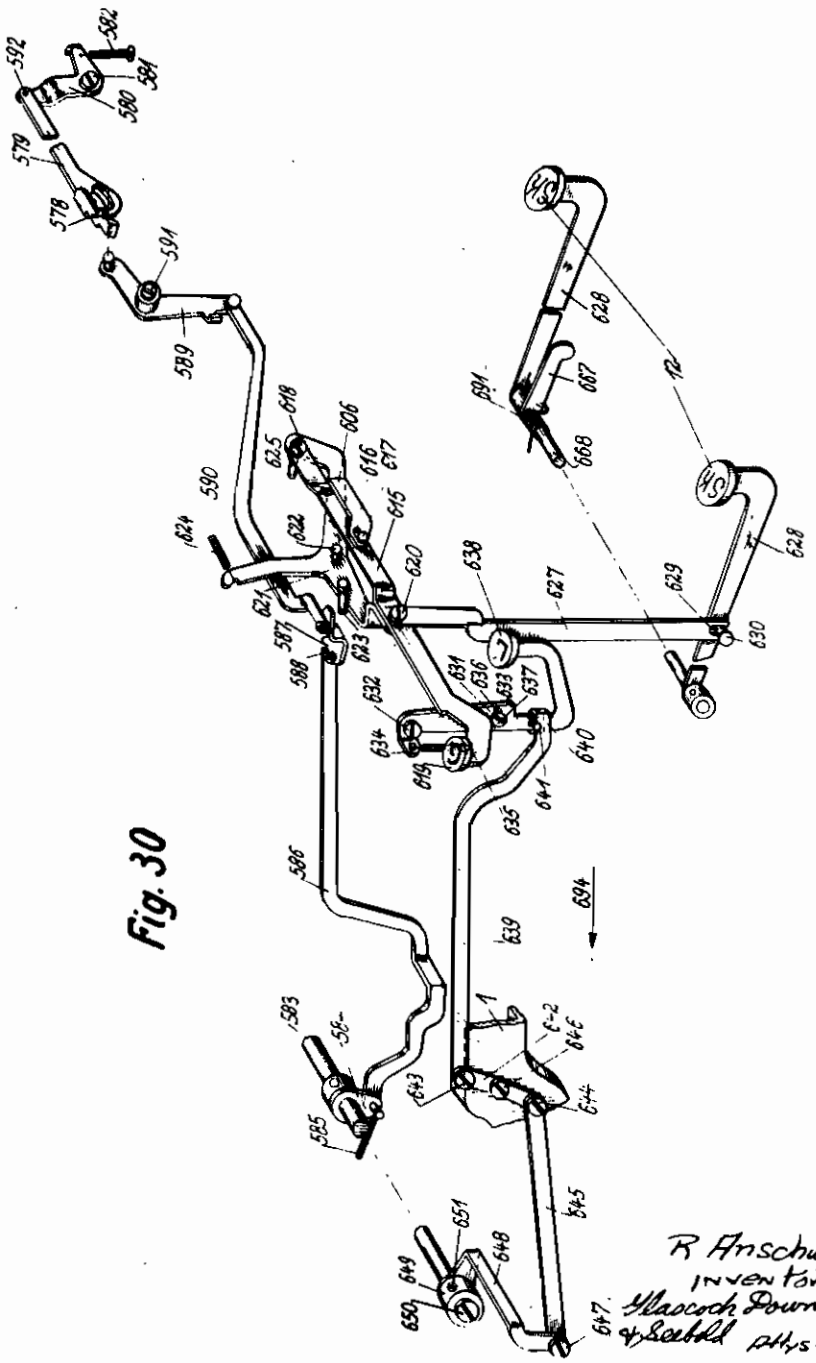

Fig. 30

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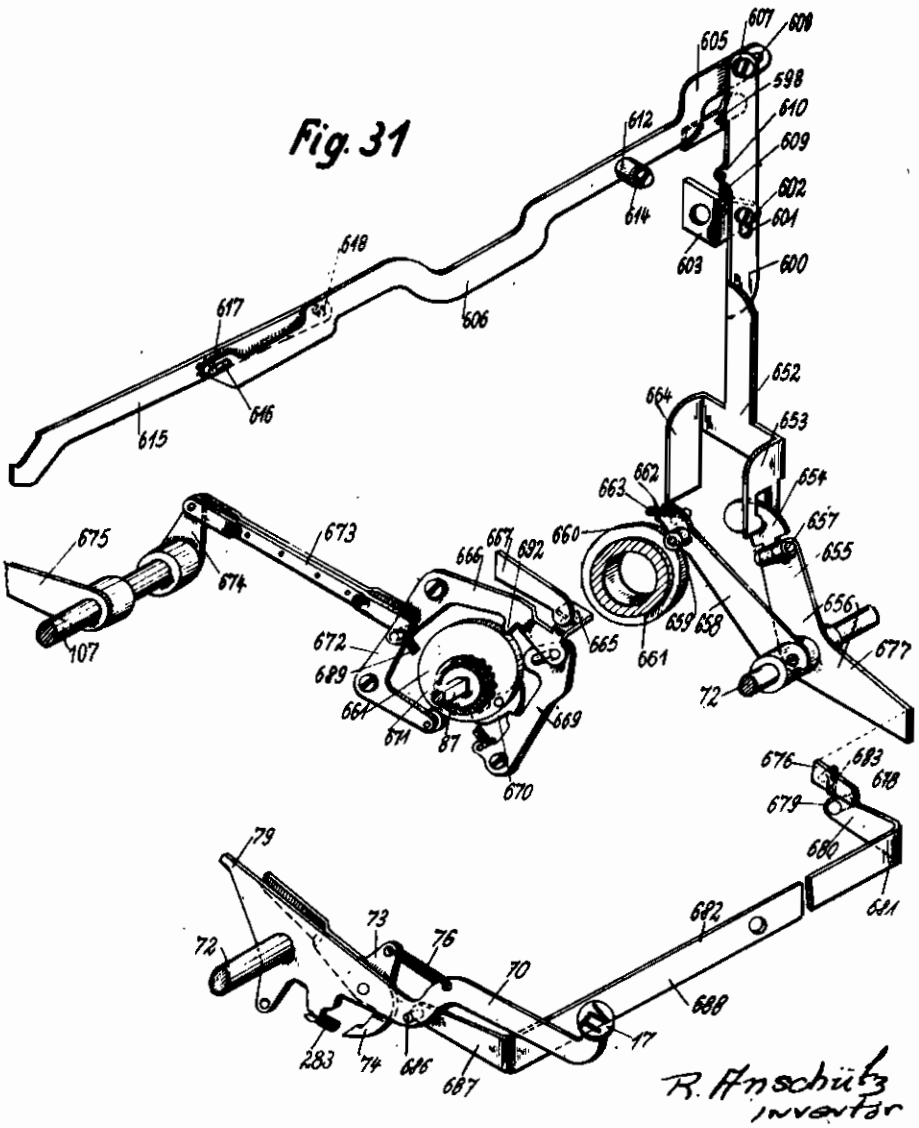
Fig. 31



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Published May 25, 1943 Serial No. 146,897

ALIEN PROPERTY CUSTODIAN

TOTAL-TAKING MECHANISM FOR AUTOMATIC CLEAR WRITING OF TOTALIZING MECHANISM

Robert Anschütz, Zella-Mehlis, Thuringia, Germany; vested in the Alien Property Custodian

Application filed June 7, 1937

The invention relates to a total-taking mechanism for automatic clear writing of totalizing mechanism by decimal places in which the selector member for the number typing keys is a cam shaft.

Such mechanisms have previously been known. However, the known devices had the disadvantage that the cam shaft for actuating the number keys was swingably arranged whereby the drive of the cam shaft was rendered difficult and the reliability impaired.

According to the invention this drawback is now obviated by fixedly mounting the cam shaft and by arranging, between the cam shaft and the number key levers, a swingable frame which can be coupled to a driving member and is provided with setting members movable into the path of the cams and number key levers.

In the drawings an embodiment of the invention is shown by way of example.

Figures 1 to 12 illustrate well known mechanisms and are merely included in this specification for a better understanding of the invention proper.

Fig. 1 shows a side elevation of a typewriting-calculating machine, in which the comma skipping device, is incorporated. This comma skipping device is actuated, if the comma place is to be bridged over during the normal calculation.

Fig. 2 shows a plan of a part of the machine according to Fig. 1 with the comma-skipping-device.

Fig. 3 shows a perspective illustration of the device according to Fig. 1 viewed from the left-hand side of the machine.

Fig. 4 shows a perspective illustration of the escapement mechanism viewed from the rear-side of the machine.

Fig. 5 shows a side elevation of a typewriting calculating machine in which the comma-skipping device is incorporated. This comma skipping device is actuated, if the comma place is to be bridge over during the automatic total taking.

Fig. 6 shows a perspective illustration of the comma skipping device according to Fig. 5, viewed from the left-hand side of the machine.

Fig. 7 shows a side elevation of a typewriting calculating machine, in which a device having a spring urged carriage controlled by an escapement, is incorporated.

Fig. 8 shows a plan of an arrangement according to Fig. 7, in which the upper part of the typewriting-calculating machine is imagined to be and only a part of the cam elements is illustrated, in order that the arrangement exposes in a better manner the details.

Fig. 9 shows a perspective illustration of the device viewed from the left-hand front of the machine, in which the carriage rack is indicated in interrupted lines.

Fig. 10 shows a part of the carriage rack in elevation.

Fig. 11 shows a section according to the line A—A of Fig. 10.

Fig. 12 shows in perspective illustration different parts drawn as under from one another, of the mechanism illustrated in Figure 9.

Fig. 13 shows a front elevation of a typewriting calculating machine embodying the mechanism according to the invention, in which of the paper carriage only the suspension rail of the totalizing mechanisms and the totalizing mechanisms are shown;

Fig. 14 shows a plan view of the machine shown in Fig. 13, illustrating the front part of the machine only;

Fig. 15 shows a left-hand side elevation of the machine according to Fig. 13, in which only the most important parts of the mechanism according to the invention are shown;

Fig. 16 shows a left-hand side elevation of the machine according to Fig. 13, in which the parts shown in Fig. 15 are omitted so as to give a clear view of other parts of the machine.

Fig. 17 is a plan view of the supporting frame of the machine according to Fig. 13 with the driving members positioned in the frame;

Fig. 18 shows a perspective view viewed from the front left-hand side of the machine, of a part of the known driving members of the calculating mechanism, in which for the sake of better apprehension some of the parts are represented drawn out from one another and other parts are shown broken away;

Fig. 19 shows in a perspective view details of the control mechanism of the calculating mechanism for automatic total-taking, also viewed from the front left-hand side of the machine, sundry parts drawn out from one another or broken away for better apprehension.

Fig. 20 shows further control and driving members of the calculating mechanism for automatic total-taking also in perspective viewed from the front left-hand side, said parts drawn out from one another or broken away for better insight.

Fig. 21 is a side elevation of the principal parts according to Fig. 20;

Fig. 22 shows a front elevation of the parts according to Fig. 21;

Fig. 23 shows also a front elevation of a detail of Fig. 22;

Fig. 24 shows in perspective, also viewed from the front left-hand side, the preparatory and control members for the typewriting mechanism, some of which are represented drawn-out from one another or broken away for better insight;

Fig. 25 shows further coupling and operative members for the typewriting mechanism also in perspective viewed from the front left-hand side, some of which are shown drawn-out from one another or broken away;

Fig. 26 is a plan of the parts according to Fig. 24 and 25;

Fig. 27 shows further mechanism substantially known, which are operated in automatic total-taking, in perspective viewed from the front left-hand side, some of said parts shown broken away;

Fig. 28 shows a left-hand side elevation of a complement totalizing mechanism, the left-hand side of the housing removed to lay bare the parts of the driving gear;

Fig. 29 is a perspective representation of the complement totalizing mechanism according to Fig. 28, viewed from the front right-hand side;

Fig. 30 is a perspective view seen from the front left-hand side of further mechanisms operated principally in automatic total-taking in adding operations, the parts drawn out one from another or broken away for better apprehension;

Fig. 31 shows also a perspective view seen from the front left-hand side, of mechanisms operated principally in automatic total-taking in adding operations, the parts drawn-out from one another or broken away for better insight;

Fig. 32 is a diagrammatic representation of part of a form on which booking entries are recorded by way of example which are booked by means of the machine according to the invention.

General description of the machine

The principal parts of the machine are the machine frame 1 (Figs. 1, 5, 7, 14, 15 and 16) a paper carriage 2 displaceably attached to carriage running rails 3 and 4 fixed to the machine frame, and totalizing mechanism 5 to 8, an idle totalizing mechanism 7 and a complement totalizing mechanism 8 (Figs. 13 and 15), provided for a definite booking operation and attached to a suspension rail 9 fixed to the paper carriage 2. The machine is further provided with a calculating mechanism 10 carrying the calculating elements and being fixed to the front side of the machine frame 1. In the machine frame 1 a typewriter keyboard 11 is arranged with shift keys 12 and a carriage return key 13 (Figs. 13 and 14) for controlling the carriage return mechanism. Also keys 14 of a decimal tabulator have been provided in the machine frame 1. A bearing frame 15 (Figs. 1, 5, 7, 8, 13, 15 and 17) constitutes a further part of the machine, and in this frame 15 are provided calculating keys 19 (Figs. 1, 7, 13, 14 and 16), a total-taking key 17, curve elements associated thereto, a curve element for the change-over operation and other mechanisms. A motor 18 (Figs. 13, 14) fixed to the right-hand side of the machine frame drives by means of a suitable gearing the calculating curve elements, the typing mechanisms and the carriage return mechanism.

Operation of the comma skipping device for skipping the comma place during normal calculations

If a tabulator key 14 is depressed the key lever 20 (Figs. 1, 7, and 16) is rocked round the shaft 21 in the clockwise direction, whereby the slide 22 is moved in the direction of the arrow 23. Hereby the beveled surface 24 of the slot 25 of the slide 22 acts upon the shaft 26 of the housing 27 (Figs. 1, 7, 15 and 16) whereby the latter and the shaft 28 are rocked in the clockwise direction. Simultaneously the lever 29, arranged on the shaft 28 is rocked in the same direction. This lever 29 acts upon the projection 30 of the lever 31, whereby the loose dog 34 is brought out of engagement with escapement wheel 35 through the intermediary of the parts 32, 33, so that the carriage 2 is moved towards the left under the tension of the known carriage-putting-spring 36 (Fig. 4) as long until the corresponding adjusted tabulator stop 37 abuts against the slide 22, whereby the carriage 2 is stopped. If the tabulator key 14 is released the loose dog 34 comes again in engagement with the escapement wheel 35.

In the rocking of the lever 31 the latter acts with its projection 30 (Figs. 1, 3 and 5) upon the projection 38 of the lever 39, screwed on an arm 40 of an angle-lever 41 which is rockably arranged round the shaft 28. Consequently the angle-lever 41 is rocked round the shaft 20 in the clockwise direction. Hereby the angle lever 41 rocks the two-armed lever 44 in the anti-clockwise direction through the intermediary of the pin and slot connection 42, 43. Consequently the lever 44 presses with the pin 45 of its arm 46 upon the lug 47 of the bearing plate 48 and rocks the bearing plate and the shift pawl 49 rockably arranged on the bearing plate 48 round the bearing bolt 51 against the action of the spring 50 in the anti-clockwise direction. Hereby the shift-pawl 49 is moved with its projection 52 out of the path of the projections of the stops 54 (Figs. 2 and 3) for the skipping device.

As above described on depression of the tabulator key 14, the projection 52 of the shift pawl 49 is brought out of the path of the projections 53 of the stops 54 of the skipping device, so that, if simultaneously the loose dog 34 is brought out of engagement with the escapement wheel 35, the paper carriage 2 is moved one step towards the left under the action of a known carriage pulling spring. Since on striking of the corresponding tabulator key 14 the associated tabulator counter stop 22 (Figs. 1 and 7) has been moved in the direction of the arrow 23 the carriage 2 is stopped by striking of the projection 55 of the stop 37 of the associated totalizer against the raised tabulator counter stop 22. After having performed this working process the depressed tabulator key 14 is released whereby the same as well as the parts connected therewith and the shift pawl 49 are restored to the normal position under the action of the tabulator key spring (not shown). If the totalizer is brought in the operative position, as described, the value which is to be calculated may be transmitted to the totalizer by depression of the corresponding calculating keys.

If now the totalizer with its units place is in the working position, the projection 52 lies to the left of the projection 53 (Fig. 2) of the stop 54 of the skipping device at a pitch or a carriage step-space respectively. The working face of the projections 52 and 53 however are spaced from one another about somewhat more than a pitch. The carriage step space which is effected after bringing in and after printing the value into the units place, brings shortly before its performance the stop 54 with its projection 53 in working

connection with the projection 52 of the shift pawl 49. Hereby the projection 53 of the stop 54 acts upon the projection 52 of the shift pawl 49, which rocks the lever 91 round its bearing screw 62 in the clockwise direction through the intermediary of the parts 56, 57, 58, 48, 51, 59 and 60, whereby the lever 63, which is resiliently connected with the lever 61, is rocked in the same direction. Consequently the rigid dog 64 (Figs. 3 and 4) comes in engagement with the escapement wheel 35 and the loose dog 34 comes out of engagement with the escapement wheel 35. During this shifting the stop 54 has released the shift pawl 49 and therewith the lever 61 so that, if the levers 61 and 63 are restored to the initial position by the spring 65, the dog rocker 66 is likewise restored in its normal position under the influence of the spring 67. Hereby the rigid dog 64 releases the escapement wheel 35 and renders effective a carriage shifting at one stop, which is limited by coming in contact of the loose dog 34 with the escapement wheel 35. As described the comma place has been automatically skipped, whereby the totalizer is in working position with its tenth place.

Operation of the comma skipping device for skipping the comma place during the automatic total taking

If the total key 17 (Fig. 5) is depressed, the lever 70 (Figs. 5, 6) of the total key 17 is rocked round the shaft 72 against the action of the spring 283 in the clockwise direction. In this rocking movement the locking lever 73 participates. Hereby the locking arm 74 of the locking lever 73 slides from the locking shaft 75, whereby the same is rocked in the clockwise direction under the action of the spring 76 before the rocking movement is finished. Hereby the locking arm 74 enters into a notch 78 of the rocking shaft 75. The total key lever 70 is locked as long as the totalizer, which is in the working position, is cleared.

During the rocking of the total key lever 70 in the clockwise direction round the shaft 72 the arm 79 is likewise rocked, whereby the same comes out of engagement with the projection 80 of the coupling pawl 81. Consequently the clutch pawl 81 is moved towards the coupling wheel 83 by the spring 82, so that the projection 84 of the coupling pawl 81 comes in engagement with one of the tooth spaces of the coupling wheel 83. Hereby the cam disc 85 is coupled with the continuously rotating shaft 87, which is rotated in direction of the arrow 86 (Fig. 6). In the rocking movement of the total key lever 70 the arm 88 participates, whereby the lever 89 is moved in the direction of the arrow 90. Hereby the shank of the headed rivet 81 slides along underneath the inclined end of the slide 93 in the direction of the arrow 90. Here by the slide 93 is raised in the direction of the arrow 23. On this movement the lever 95 participates, whereby the same is rocked round its point 96 in the anti-clockwise-direction. Consequently the projection 97 is raised in the direction of the arrow 23 so far that the same comes in an operative position with the projections 53 of the pointing off stops 54. During the lifting movement of the slide 93 in the direction of the arrow 23 the part 98 is likewise lifted in the same direction. Hereby the part 98 acts upon the levers 39 and 40 (Fig. 3), whereby the same are rocked round the bearings 28 (Fig. 5) in the clockwise direction. The parts 46 and 49 (Fig. 3) participate in the movement, whereby the pawl 49 is rocked round the bearing 51 against the action of the spring 50 (Fig. 5) in the anti-clockwise direction, as described under the heading "Operation of the comma skipping device for skipping the comma place during the normal calculations." Consequently the pawl 49 is limted with its shifting projection 52 out of the moving path of the projections of the pointing off-stops 54.

As described under the heading "Typing process" the cam 85 acts upon the roller 99 (Figs. 5, 27) of a swinging frame 103 to 104 at each rocking movement of the continuously rotating shaft 87 in the direction of the arrow 86. The roller 105 of the swinging frame 150 to 104 acts hereby, upon the lever 106 and rocks the same round the shaft 107, whereby the arm 108 acts with its headed rivet 109 upon the end 180 of the bar 111 and displaces the bar 111 against the action of the spring 112 in the direction of the arrow 23, without influencing any other parts.

The above mentioned working processes are repeated during each revolution of the cam 85, whereby the parts 106 and 111 are restored to the normal position after each revolution.

As described under the heading "Automatic total-taking" the automatic clear writing of a totalizer takes place digit by digit beginning in the highest decimal place, whereby if a decimal place is cleared, a carriage step takes place. Since, now, in the pointing off place neither a calculating process is caused nor a value is printed, no carriage step takes place, which moves the totalizer from the pointing off place to the next lower decimal place.

If now the totalizer comes in the working position with its pointing off place during the carriage left-movement which is caused during the total taking, the pointing off stop 54 slides with its projection 53 upon the projection 97 of the lever 95. Consequently the lever 95 is rocked round the bearing 118 in the clockwise direction. In this movement the bar 118, which is arranged on the arm 117 of lever 95 participates, whereby the same is lifted in the direction of the arrow 23. Hereby the end 121, which is guided in the slot 119 of the guiding-angle 128, slides along the end of the slot 119, whereby it is influenced against the direction of the arrow 98. Since the upper end 123 of the bar 111 is held in a resiliently connection with the end 121 of the bar 118, the same takes part in the displacement against the direction of the arrow 98 whereby the bar 111 is rocked round the pin 124 in the clockwise direction, without coming out of engagement with the headed rivet 109 of the lever 106. The upper end 123 of the bar 111 is moved under the end 125 of the arm 126 of the left lever 127 of the space key 130. If now the parts 108 and 111 are actuated during the revolution of the shaft 87 or cam 85 respectively in the pointing off-place, the displacement-movement of the bar 111 in the clockwise direction is transmitted to the arm 128 of the left lever 127 of the space key 130 through the intermediary of the offset 125, whereby the lever 127 of the space key 130 and the parts 128, 129 connected with the space key 130 are rocked round the bearing 131 in the clockwise direction. The rocking of the parts of the space key 130 is transmitted to the dog rocker 68 through the intermediary of the parts 132 to 137, whereby the dog rocker 68 is rocked round the bearing 139 in the anti-clockwise direction and the escapement wheel 35 is released for a left-hand movement of the carriage at one step as described under the

heading "Operation of the comma-skipping-device for skipping the comma-place during the normal calculations". Hereby the totalizer is brought from its comma place to the next lower decimal place, what takes place by the automatic-actuation of the space key 130. After the comma-place is automatically skipped, the projection 53 of the comma-stop 54 releases the projection of the lever 85. Since, now, the end 121 of the bar 118 is drawn towards the rear end of the slot 119 by means of the spring 138 and consequently the end 121 of the bar 118 efforts to slide off the end of the slot with its beveled surface and to influence the bar 118 against the direction of the arrow 23, the bar 118 follows this effort. Hereby the lever 85 is returned round the bearing 116 in the anti-clockwise direction. The lever 95 remains, however, in its lifted position, in which position the lever 95 is in an operative position to projections 53 of comma stops 54, which are set, because the slide 83 with its bearing screw 116 is still in the lifted position.

If, now, after the totalizer is automatically cleared digit by digit, the locking 74, 78 is released, the total-key lever 70 is restored to its normal position (Fig. 5) under the action of the spring 283, what takes place by rocking round the bearing 72 in the anti-clockwise direction. Consequently the arm 79 of the total key lever 70 is again moved into the moving path of the projection 80 of the coupling pawl 81, so that projection 60 of the pawl 61 contacts with the arm 78 of the total key lever 70. Hereby the coupling pawl 81 is displaced against the action of the spring 82 in such a manner, that the same comes with its projection 84 out of engagement with the coupling wheel 83, so that the cam 85 cannot take part on the further revolution of the shaft 87. If the total key lever 70 is restored to its normal position likewise the lever 89, which is jointed to the arm 88 of the total key lever 70, is drawn back into its normal position (Fig. 5) against the direction of the arrow 98, whereby the headed rivet 91 slides along underneath the beveled end 92 of the slide 93. Consequently the slide 93 and the lever 85 drop back against the direction of the arrow 23 by the deadweight so that they take up again the position, shown in Fig. 6. In this position the projection 97 of the lever 85 is out of an operative position with the comma stops 54. Likewise the part 68 is restored to its normal position against the direction of the arrow 23. In this movement the parts 39 to 49 participate under the action of the spring 50, whereby the pawl 49 is restored to its initial position round the bearing 51 in the clockwise direction in which position the pawl 49 lies with its projection 52 in the moving path of the projections 53 of the comma stops 54.

Operation of a device having a spring urged carriage controlled by an escapement

By a motor 18 (Fig. 13), a shaft 87 (Figs. 7 and 8) is rotated by way of a wheel 141 constantly in the arrow direction 86 (Figs. 7 and 8). Since the mechanisms hereinafter described are referred to in detail in the U. S. Patent 2,046,524 these at this point shall only be mentioned briefly.

Now, if a calculating key 16 is struck, so the coupling pawl 142, displaceably mounted on the cam 143 is released and under the action of its spring 144 is displaced in the arrow direction 145 whereby the nose 146 of the coupling pawl 142 enters into the tooth space lying opposite to it of the locking wheel 83 associated with this pawl and fixed on the shaft 87. Consequently, the cam 143 which actuates a differential member 147 (Fig. 7) participates in the rotation of the shaft 87 in the arrow direction 86. Hereby, the differential member 147 is drawn down by a tension spring 148 (Fig. 7) associated with it, and the key lever 148 is actuated by the projection 150 (Fig. 7) of the differential member 147. The key lever 149 brings by way of a lever 151, a draw lever 152 into driving connection with the cam shaft 153, whereby the type lever 154 is caused to strike by way of the intermediate lever 155 (Fig. 7). The type lever 154 thereby actuates through its projection 156 the dog rocker 66 carrying the loose dog 34 and the fixed dog 64, by way of the parts 157, 158, 136 and 137, whereby the escapement wheel 35 and pinion 161 (Fig. 4) engaging the rack 162 are released. Consequently, the paper carriage 2 under the pull of the usual carriage draw spring (not shown) arranged in a housing 163 (Fig. 4) at the rear wall of the machine frame, is moved through one step to the left. Since, however, the spring pull, especially with long carriages is too sluggish, and in consequence of the great difference in the tension of the spring resulting from the long carriage travel is too non-uniform, according to the invention, the carriage is positively moved forwards in the following manner.

The cam 163 (Figs. 7 to 9) which is rigidly connected with the cam 143, likewise participates in the rotation of the shaft 87 in the arrow direction 86, whereby the projection 164 (Figs. 7 and 9) of the cam 163, acts on its associated roller 165 of the bridge 101, 103, 106, 102 and swings the same in the arrow direction 96.

Now, since the levers 167 and 168 fixed on the shaft 107, are connected through the slots 169 and 178 by way of the pins 171 with the arms 172 (Figs. 7 to 9) of the bridge the levers 167 and 168, together with the shaft 107, are moved in the arrow direction 94 and simultaneously the lever 173 likewise fixed on the shaft 107 in the arrow direction 64 (Figures 7 to 9). The rod 175 engaging with the pin 176 of the lever 173 and held by the spring 177 is now drawn down and by means of the springs 178 takes the rod 179 along with it against the direction of the arrow 23. Accordingly, the angle lever 180 is swung in the arrow direction 181, whereby the insertion member 182 and the shift nose 183 which together are rotatably mounted on the horizontal bent lug 184 of the angle lever 180, are simultaneously moved in the arrow direction 161 (Fig. 9). Since in this movement the inclined face 185 of the part 182 slides off from the nose 186 of the angle 187, a movement of the parts 182 and 183 occurs in the arrow direction 188 (Fig. 9). Therefore in the corresponding co-operation of the movements in the arrow direction 161 and 188 (Fig. 9) the shift nose 183 first is engaged with one of the teeth 189 (Fig. 4) of the rack 162 and simultaneously shifted forward, so that the carriage is carried along with it in the carriage step direction. By means of the torsion spring 188 on the shaft 107, which on the one hand is connected to the hole 191 of the collar 192 fixed on the shaft 107 and on the other hand is connected to the downwardly directed leg 193 of the support 194 all the parts of the mechanism are brought back into their rest position as soon as the projection 164 of the cam 163 has released the associated roller 165. In order now to avoid in this return the possibility of shocks of sticking of the shift nose 183 in the teeth 169 of the rack 162, the

shift nose 183 is arranged to be rotatable in the clockwise direction, to the insertion member 182. A torsion spring 185 one end of which engages with the insertion member 182, while the other end engages with the nose 183, presses the latter with its stop face 196 against the face 197 of the insertion member 182, but permits, however, through rotation in the clockwise direction a ratcheting over the teeth 189 of the carriage rack 162 under the influence of the spring 195. The two rods 175 and 179 connected together by the springs 178 and acting as a single rod, have the following purpose.

The extent of the carriage step, is determined, by the loose dog 34, which engages in the shift wheel 35. Since, now, the shift nose 183 engaging in the carriage rack 162 displaces the carriage to the left and consequently the tooth for the time being of the escapement wheel 34 bears hard on the loose dog 34, so the form of the cams 183 must be shaped with the utmost accuracy in order to correspond accurately to the stroke limited by the loose dog 34, since otherwise considerable jamming could occur. By the arrangement of the springs 178 however, no particular attention requires to be paid to the form of the cams 183 whereby the assembly of the mechanism may be simply and cheaply performed and the greatest reliability in the operation of the same, is ensured.

Normal calculating and typing operation taking place when making booking entries in the columns I to III of the form

To this end the totalizing mechanisms 5 to 8 corresponding to the column I to IV of form 200 (Fig. 32) are suspended from the suspension rail 9 for the totalizing mechanisms (Figs. 13 to 15) and the riders 37 (Figs. 15 and 16) associated thereto are adjusted or set on the rider-bar or shaft 115. The form 200 is also properly adjusted on the platen and set to writing position with respect to the first writing line. By actuating carriage release lever 201 the paper carriage is then moved into the extreme right-hand position.

In order to effect the booking entries in columns I to III on the first writing line of form 200, it is necessary to bring the paper carriage with the totalizing mechanisms 5 to 7 or the columns I to III of form 200, respectively, into the respective required working or operating position. This is effected by depressing the tabulator key corresponding to the value to be booked, of the decimal tabulator keys 14, whereby the paper carriage is released for a movement to the left, which is stopped at the required position by the cooperation of the corresponding tabulator rider 37 and the column selector lever 22 (Figs. 15 and 16) associated with the depressed tabulator key.

When running into the selected operating positions, the totalizing mechanisms act, as the case may be, by means of control plates 202, 203 and 204 (Fig. 16) on controlling members 261, 264, 278 (Figs. 19 and 14), whereby is effected, in a manner to be hereinafter described under the heading "Total taking process in the calculating mechanism," the release of the calculating mechanism, the adjustment of the particular species of calculation and the actuation of a coupling sleeve 205 (Fig. 14) for selective coupling of the calculating mechanism driving wheels 206 and 207 with the driving shaft 208 (Figs. 14 and 18), on which shaft 208 said driving wheels 206 and 207 are rotatable, but not shiftable axially. In the same manner the totalizing mechanisms, when moving into operating position, will slide lengthwise with a bent-off portion 209 of the guide plates 210 fixed to them, below a roller 211 (Figs. 14, 16 and 28) rotatably fixed to an angle shaped guiding member 212 screwed to the front side 214 of the calculating mechanism 11 by means of screws 215. When moving into their operating position, the guiding plates 210 act also on members hereinafter described under the heading "Total-taking process in the calculating mechanism" without actuating, however, any further mechanism. Further, when moving into their operating position, the calculating mechanisms are caused to selectively engage, according to the respective operating position, with the driving wheels 216 and 217 (Figs. 14 and 18) fixedly arranged on the shaft 208 and with the driving wheels 206 and 207 adapted to be coupled selectively to the shaft 208.

For the purpose of calculating and writing down the values to be booked, the respective calculating keys 18 are depressed successively and with every depressed key the following operations will be started. If, for instance, the calculating key corresponding to the number "1" of the value "153.42" to be booked first, is depressed, the associate key lever 218 is swung around its shaft 72, whereby in turn the curve disc 143 associated with the swingable key lever 218 is coupled for one rotation to the shaft 67 driven continuously by the motor 18. During the first half rotation of the curve disc 143 now taking place, the totalizing slide 147 (Figs. 16 and 18), which is always held towards the curve disc 143 by means of springs 148 and 219 will follow the descending curve portion under action of the said springs. In consequence, the totalizing slide 147 is caused to make a downward movement, at the beginning of which the inclined face 220 (Figs. 16 and 18) of the slide acts on the ledge 221 of the swinging frame 221, 222, 223, 224 and causes the frame to swing in the direction of arrow 225 against action of spring 226 bearing upon lever 227 fast on shaft 224. The spring 226 continually pulls the bent-off portion 228 (Fig. 14) of lever 227 against the backwall of the calculating mechanism thus determining the normal position of shaft 224 and of the parts or elements mounted thereon. When the swinging frame 221, 222, 223, 224 swings as above indicated, the levers 229, 230, 231 and 232 (Figs. 14, 18) associated with the driving wheels 206, 207, 216 and 217 and fixed on shaft 224 are also caused to swing and in turn act on the release levers 233 of the totalizing mechanisms (Fig. 28), which are just in operating position with respect to the levers 229, 230, 231 and 232. These respective release levers, according to the exemplified first booking operation, are the release levers 233 of the hundreds places of the totalizing mechanisms 5 and 6 and of the complement totalizing mechanism 8. Since the values are only written down in column III, but not calculated or totalized in the totalizing mechanism 7, this has been designed as an idle totalizing mechanism and has, therefore, no driving parts or gear, so that in this operation the lever 239 of the swinging frame 221, 222, 223, 224, swings in idle motion without acting on any totalizing mechanism release lever. The lever 234 (Fig. 18) also fast on the shaft 224 of the swinging frame 221, 222, 223, 224 acts during the swinging movement referred to, by its inclined bent-off portion 235 on the slide 236 in driving connection with the totalizing segment or sector 237, displacing it in the direction of the

arrow 238 (Fig. 18). In consequence, the totalizing segment 237, which in its normal position is kept out of engagement with the driving wheel 239 fast on shaft 240, is swung around its pivot screw 241 so that it is caused to engage the driving wheel 239. The lever 242 also fast on shaft 224 is swung in the same direction as the levers 229 to 232, whereby the lever 242 disengages the ratchet wheel 243, thus releasing the gear system of the calculating mechanism. During its further downward movement the totalizing slide 147 co-acts, by means of its totalizing curve 244 (Figs. 16 and 18) with the shaft 245 of the swinging frame 245, 246, 247, 248, to beam 248 of which the totalizing segment 237 is mounted laterally swingable around the screw 241. The swinging frame 245, 249, 247, 248 is thus swung in the direction of arrow 249 (Fig. 18) around the pivot screws 250 and the totalizing segment 237 which is in a fixed relation to the swing frame 245, 246, 247, 248 in this direction of movement, partakes of this swinging movement. Due to the driving connection 237, 239 previously made, this movement is transmitted to the shaft 240 and by way of the driving elements 251, 252, 253 and 254 to the driving shaft 206. By means of the driving wheels 218 and 217 fast on shaft 208 this movement is also transmitted to the main driving wheels 255 (Figs. 15, 16 and 28) of the totalizing mechanism 5 and of the complement totalizing mechanism 8, which in turn transmit this movement by way of the totalizing mechanism driving elements 258 and 257 (Fig. 28) to the number rollers 258. Now, the number "1" is shown in the hundreds places of the totalizing mechanisms 5 and 8 on their number rollers 258. No transmission by the driving wheels 206 and 207 to the totalizing mechanisms 8 and 7 has been effected in this case, because in the first booking operation the coupling of these driving wheels has been controlled in such a manner, that the driving wheel 208 is out of, and the driving wheel 207 is in driving connection with the shaft 208. Accordingly, the driving wheel 206 and the driving elements of the totalizing mechanism 6 are not acted upon. The driving wheel 207, though taking part in this movement, does not transmit its movement to the idle totalizing mechanism 7, since this has no driving elements, the idle totalizing mechanism 7 being fitted only with the controlling members for controlling the calculating mechanism release and the members for setting the species of calculation. Shortly before the totalizing slide has finished its downward movement, it co-acts, by means of the angle piece 180 fast on it (Figs. 16 and 18), with its associate number writing key lever 149 for the number "1" and causes it to swing in a clockwise direction around the pivot bar 259. By means of the intermediate member 151 the driving connection is consequently established between the lever system 151, 155 of the type lever 154 and the cam shaft 153 continually driven by means of the motor 16 and the type lever for typing the "1" of the value "153.42" in column I of the form 200 (Fig. 32) is operated. When the type lever printing the type falls back, the carriage control mechanism (not shown in the drawing) is acted upon and the paper carriage is released for a movement to the left by one step. For the purpose of effecting the stepwise transport of the carriage in the comma place, the machine under discussion has been provided with a bridge over mechanism described under the heading "Operation of the comma skipping device for skipping the comma place during the normal calculations." In machines not equipped with this mechanism, the comma place is bridged over by actuating the space key.

During the second half rotation of the curve disc 143 its rising curve portion acts on the totalizing slide 147 and displaces it against action of springs 148 and 219 upwards into its normal position. Hereby all mechanism actuated are caused to return to their normal position by forced motion or under action of their associated springs.

With each depression of a calculating key of the calculating keys 16 for the purpose of booking operations to be performed in columns I to II, the working operations will be repeated. The totalizing slide 280 (Fig. 18) corresponding to number "0" has not been provided with an inclined face 220 for controlling the release nor with a totalizing curve 244, because no totalizing operation has to be effected by this slide, it is merely provided with an angle piece 150 to actuate the key lever for typing the "0". The booking entries to be made in column III of the form 200 are recorded, but not indicated in the idle totalizing mechanism 7. In order to indicate if in column III a negative balance is booked, as is the case for instance with the value "302.85," this previous negative balance is written down in inclined numbers. To this end the general change over key 619 described under the heading, "Total-taking by addition" is depressed prior to the booking operation, and the platen is changed over.

In the various booking operations the coupling is always controlled in such a manner that each of the booking entries in the columns I to III is transmitted to the complement totalizing mechanism additively or subtractively according to whether a credit or debit item or sum, or a debit or credit balance, respectively, is booked. The new balances thus struck or calculated in the complement totalizing mechanism 8 are now written out or withdrawn from the complement totalizing mechanism 8 by automatic total-taking and are written down in column IV of form 200 for which purpose the following mechanisms are provided and put into operation.

Automatic total-taking

The values shown in the complement totalizing mechanism 8, which have been calculated from the values booked in the columns I to III, are now to be written out or withdrawn from the totalizing mechanism 8 by means of automatic total-taking and recorded in volumn IV. To this end it may be assumed that first the value "417.95" is to be withdrawn from the complement totalizing mechanism 6 and written down on the first booking line in column IV of the form 200. Since the value "417.95" represents a new debit balance, that is a value introduced by addition into the complement totalizing mechanism 6, it must be withdrawn from the said totalizing mechanism by subtraction. To place the paper carriage into the required position, the hundreds tabulator key 14 of the decimal tabulator corresponding to the value "417.95" is depressed, whereby the tabulator key lever 20 (Fig. 16) associated to this lever is swung in a clockwise direction around its pivot screw 21 and the column selector lever 22 associated to lever 20 is raised. In doing so, the column selector lever 22 renders the carriage step lock ineffective. Consequently, the paper carriage 2 is displaced to the left-hand side by the carriage return-spring, this movement being lim-

ited by the tabulator rider 37 associated with the complement totalizing mechanism 8 and striking against the said column selector lever 22. In this position the complement totalizing mechanism 8 (Figs. 15 and 28) is in engagement by its hundreds place with the driving wheel 218 of the calculating mechanism 10, while column IV of the form 200 is in writing position.

The complement totalizing mechanism 8, when running into the above mentioned position, acts by its control plate 202 (Figs. 15 and 28) on the lever 261 (Fig. 14), thus causing it to swing in a clockwise direction and against the action of its spring 262 around its pivot 208. Consequently, the lever 263 fast on shaft 224 is released or set free for the release of the calculating mechanism gear. Further, the complement totalizing mechanism 8, when entering into the said position, acts by the control plate 203 on the angle lever and causes it to swing in a clockwise direction against the action of its spring 264 around the pivot screw 265 screwed into the front wall 214 of the calculating mechanism. The elements 266 to 273 and 251 (Fig. 19) which are in driving connection with the angle lever 264, also participate in the movement and hereby the wheel 251 is caused to disengage wheel 252 and to engage wheel 274 (Fig. 18), whereby the direction of rotation of shaft 208 is changed and the type of calculation is changed from addition to subtraction. The complement totalizing mechanism 8 in place of the control plate 204 is provided with a control plate 275 swingable round a shaft 276 (Fig. 28) and held in the position the control plate 275 cannot act on angle lever 278, so that the latter is not influenced by the complement totalizing mechanism when this is moving into the position above indicated. In consequence, the coupling sleeve 205 (Fig. 14) is not operated. When moving into the indicated position, the complement totalizing mechanism 8 further acts for a short moment by means of a downwardly bent catch 279 of the bent-off portion 209 of the guide plate 210 on the members 336, 330 (Fig. 19) without influencing any further mechanism. At the same time the bent-off portion 289 of the guide plate 210 slides below roller 211 of the angle member 212, whereby the said totalizing mechanism is guided during the total-taking operation.

After the complement totalizing mechanism 8 has been placed into operative position the total-taking key is depressed whereby the following mechanisms are actuated.

Preparing the total-taking process by depressing the total-taking key

On the shaft 72 fixed in the supporting frame 15 a total-taking key lever 70 (Fig. 15) is swingably mounted which lever in its position of rest together with the catch 280 of arm 280*a* is continually pressed against the locking bar 75 by means of a spring 263 attached to said arm 280*a* on the one side and to a spring suspension rail 281 on the other side. Said suspension rail 281 is fixed to the inside of bearing frame 15 by means of screw 282. The catch limb 74 of locking lever 73 swingably attached to the total-taking key lever 70 by means of a headed screw 77 is continually pressed under action of spring 76, against locking bar 75 fixedly mounted in the bearing or supporting frame 15. A lever 285 which is swingably mounted on the shaft 72 (Fig. 15) is caused by means of spring 208, to act continually against a face 287 of locking bar 75 whereby the position of rest of lever 285 is determined. Lever 285 cooperates with a roller 288 fixed to a cam 85 fast to another cam 289. A coupling pawl 81 shiftably connected to the cams 289 and 85 by means of rivets 290 and slots 291 is continually held against the arm 79 of the total-taking key lever 70 by action of spring 82, whereby the coupling pawl 81 is held in disengaged position with respect to the coupling wheel 83 non-rotatably arranged on shaft 87. By the torque or twisting moment set up at the cams 85 and 289 by spring 82 the roller 288 of the cam 85 is pressed against a corresponding face 292 (Fig. 15) of lever 285 whereby the said cams are retained in the position of rest shown in Fig. 15. If the total-taking key 17 is depressed, the total taking key lever 70 is caused to swing around its pivot shaft 72 in a clockwise direction against the action of spring 283. The locking lever 73 is also displaced thereby and with its catch limb 74 slides off the locking bar or shaft 75 and swings around its pivot screw 77 in a clockwise direction under the action of spring 76 when the total-taking key lever 70 has finished its swinging movement, whereby the catch limb 74, engages a groove 78 of locking bar or shaft 75. In consequence, the total-taking key lever 70 and the locking lever 73 are retained in the operating position described. The arm 284 of the locking lever 73 is now in operative position with respect to an element 326. Arm 78 of the total-taking key lever 70 by its swinging movement is removed from its operative position with regard to the coupling pawl 81, causing the latter, under action of its spring 82 to move towards the coupling wheel 83 so as to engage same. Hereby the cams 85 and 289 are coupled to shaft 87 continually driven by motor 18.

Total-taking process in the calculating mechanism

At the inside of the calculating mechanism 10 a slide 293 (Figs. 15 and 19) has been arranged which is guided with its lower bent-off end 294 in a slot of a guide plate 295 (Fig. 21). The plate 295 is screwed by means of screws 296 to the usual lower guide plate 297 by which the totalizing slide is guided. When the total-taking key 17 is depressed, arm 79 of the total-taking key lever 70 acts on the lower bent-off end 294 of the slide 293. An upper end 298 (Figs. 13 and 19) of slide 293 bent forward and projecting below the front side 214 of the calculating mechanism, is jointed to an arm 299 of an angle lever 300, by means of a screw 301. The angle lever 300 is swingably mounted on a screw 302 screwed into the front wall 214 of the calculating mechanism, a fork shaped arm 303 engaging a pin 304 of a slide 305. This slide 305 is arranged to be axially displaceable on the front wall 214 of the calculating mechanism by means of a slot 366 and a headed screw 307 screwed into said front wall 214, the slide 305 embracing the latter by means of a bent-off V-shaped portion 306 engaging a recess 309 (Fig. 13) of the front wall 214. A spring 310 (Fig. 19) attached to slide 293 pulls the lower end 294 of same continually downwards against the arm 79 of the total-taking key lever 70, whereby the slide 306 (Fig. 13) remains also continually displaced towards the left hand side. Both movements are limited by the screw 307, against which the right-hand end of the slot 308 lies or abuts in the position of rest. The slide 305 engages with its nose 311

the underface of a zero-setting or zero-position stop 312 (Figs. 19 and 28) screwed to a U-shaped lever 314 by means of screws 315. By means of arm 316 and 317 the lever 314 is swingably arranged on shaft 208, secured against lateral displacement on shaft 208 by the driving wheel 216 and the adjusting ring 318 (Fig. 14) fast on the shaft 208. The arm 317 of lever 314 is acted upon by a spring 319 in a clockwise direction round shaft 208, the lever acting with the zero stop 312 on the nose 311 of slide 305 and pressing this slide with its bent-off portion 308 against the recess 309 of the front side 214 of the calculating mechanism, thereby determining the position of rest or normal position of elements 314, 312 and 305. A lever 320 (Fig. 19) guided by its front end 321 in a slot 322 (Fig. 13) of the front wall 214 of the calculating mechanism and linked at its rear end 323 by means of a screw 324 to a lever 325 fast on the shaft 224 is adapted to act on slide 305 when shaft 224 is swung. Another slide 328 (Figs. 13, 15 and 19) is arranged at the inside of the calculating mechanism 10 in a similar way as slide 293 and with its lower bent-off end 327 is guided in a similar way in a slot of the guide plate 295 (Figs. 21 and 22). When depressing the total-taking key 17, the arm 284 of the locking lever 73 of the total-taking key lever 70 gets into operating position with respect to the lower bent-off end 327 of slide 328, which is thus enabled to act on the locking lever 73 in a manner to be hereinafter described. Linked by means of screw 328 to an upper bent-off end 329 projecting below the front wall 214 of the calculating mechanism is a lever 330 which in turn is swingably mounted on a screw 331 screwed into the front wall 214 of the calculating mechanism. The lever 330 is guided in a slot of an angle-shaped guiding member 332 (Fig. 13), screwed to the front wall 214 of the calculating mechanism by means of screws 333. A spring 334 continually acts on lever 330 in the direction towards the upper slotted end of the guiding angle 332, determining thereby the normal position of lever 330. On a headed screw 335 screwed into lever 330, a pawl 336 is swingably mounted, which is continually drawn against a pin 337 by a spring 330.

In the calculating mechanism 10 a release or unlocking slide 339 (Figs. 20, 21 and 22) is arranged, the lower end of which is guided in the usual guide plate 297 for the guiding of the totalizing slide, whereas its upper end is guided in the usual guide plate 340 (Figs. 21 and 22) for guiding the totalizing slide, which plate 340 is screwed to the front wall 214 of the calculating mechanism by means of screws 341. Springs 342 and 343 (Figs. 21 and 22) provided at the right and left hand side of the unlocking or release lever 339 and acting on the same are hung into spring hooks 342*a* and 343*a* (Figs. 21 and 22) and pull the said slide 339 continually downwards, the latter being pulled against the cam 289 by a roller 344 attached to the lower end of slide 339. Hereby the normal position of the release slide 339 is determined. In this position the release slide 339 acts against a lever 345 by means of a stop 346 riveted to slide 339. Lever 345 is swingably mounted on a headed screw 347 by means of a hub 348, said screw 347 in turn being screwed into a bearing angle 349 and fixed to same by means of a jam nut 350. A spring 352*a* hung on the one side to the lever 345 and on the other side to a pin 352 fixed to the inside of the back wall of the calculating mechanism, draws the lever 345 continually against an eccentric disc 351 fixed to a zero-setting slide 352*b* (Fig. 20) by means of a nut 353 and a screw 354. The zero-setting slide is hereby acted on with the lower end of its slot 355 against a guide screw 356 and is thereby held in its normal position. The guide screw 356 is fixed in the bearing angle 349 by means of a nut 357. The bearing angle 349 is screwed to the back wall 358 of the calculating mechanism by means of screws 359. The zero-setting slide 352*b* is guided by means of its slot 355 and screw 356, so as to be unmovable in a lateral, forward and backward, and shiftable in a vertical, direction. The upper side of the zero-setting slide 352*b* is guided by a pin 360 extending into a slot 361 of the zero-setting slide 352*b* so as to be unmovable in a forward and backward, and shiftable in a vertical, direction, and further guided in the upper guide plate 340 for the totalizing slides for movement in a lateral direction. The bolt 360 is riveted into an angle member 362, which in turn is screwed to the inner face of the front wall 214 of the calculating mechanism by means of screws 363 (Fig. 15). By means of screws 364 a bridge piece 365 is screwed to the zero-setting slide 352*b*, the teeth 366 of the bridge piece 365 engaging a toothed wheel 367, which in turn is fast on the shaft 368. A second toothed wheel 369 is fast on the shaft 368, which shaft is arranged rotatably between a center-punch rod 370 riveted into the bearing angle member 349 and a center-punch screw 371 screwed into an angle-shaped bearing member 372. The toothed wheel 369 meshes with a toothed rack 373. The center-punch screw 371 is adjustable and fixable in the bearing angle member 372 by means of a nut 374 (Fig. 22). The bearing angle piece 372 is screwed to the calculating mechanism side member 375 (Fig. 13) by means of screws 378 (Fig. 15). Riveted to the zero-setting slide 352 by means of the rivet 377 is an angle piece 378 provided with locking or ratchet teeth 379, a ratchet pawl 380 being capable of acting on said ratchet teeth. The ratchet pawl 380 has been swingably mounted on a headed rivet 381 together with another ratchet pawl 382. The headed rivet 381 is riveted into an angle member 383 screwed to the inside of the side member 375 by means of screws 384 (Fig. 13). The pawl 382 is continually drawn against a bent-off portion 385 of the ratchet pawl 380 by means of a spring 386. A spring 387 engaging the ratchet pawl 380 acts continually on the latter and on pawl 382 against the action of spring 386 in an anti-clockwise direction around the pivot rivet 381, maintaining the ratchet pawl 380 in operative position in relation to the ratchet teeth 379 of the angle member 378. Riveted to the unlocking or release slide 339 is a stop member 389, capable of acting on pawl 382. Said release slide 339 in turn is capable of acting, by means of an inclined face 220 (Fig. 21) of its upper end on a lug 399 of lever 398, which is swingably mounted on the shaft 224. By a spring 391 hung on the one side to the lever 390 and, on the other side, to a lever 392, the lever 390 is continually acted upon against a lug 394 of the lever 392 fixed on the shaft 224 by means of a hub 395 and a screw 398. The lever 390 is mounted axially non-displaceable between the lever 382 and an adjusting ring 397 fixed on the shaft 224 by means of a screw 398. By means of a pin 398 the lever 390 is capable of acting on a lever 400 mounted on the shaft 401, which in turn is swingably supported between the back wall of the cal-

culating mechanism and the front wall 214 of the calculating mechanism. Moreover the levers 402, and 403 are mounted on the shaft 401 and provided with the pins 404 and 405 which project into an annular groove 406 of a hub 407 of a toothed wheel 408. The toothed wheel 408 is axially displaceable on the shaft 240 and is provided with catches or projections 409 which project into the slots 410 of a flange 411 (Figs. 14 and 20) mounted on the shaft 240. Accordingly, the toothed wheel 408 is arranged non-rotatably but axially displaceable in relation to the shaft 240. A spring 412 (Fig. 23) attached on the one side to a pin fixed to the back wall of the calculating mechanism and, on the other side, to the lever 400, pulls the lever 400 continually against the pin 399, and in this position of the members the toothed wheel 408 is out of operative engagement with the teeth 414 of the zero-setting slide 352b. A locking lever 415 fast on the shaft 401 is capable of cooperating, in the operative position, with a locking pawl 416 (Figs. 13 and 20) for the purpose of locking the members which are fixedly mounted on the shaft 401. The locking pawl 416 is arranged in a recess 417 of the side wall 375 of the calculating mechanism and swingable on a pin 418 and with a limb 419 projects through a slot 420 of a slide 421. Under the pull of a spring 422 attached on the one side to a pin 423 of the arm 419 of the locking pawl 416 and on the other side to a pin 424 fixed to the side wall 376 of the calculating mechanism, the locking pawl in its position of rest is continually acted on against the lower end of the slot 420 of the slide 421. Said slide has been arranged slidable by means of a slot 425 at its upper end and a headed screw 426 screwed into the side wall 375 of the calculating mechanism, a distance ring holding slide 421 at the required distance from the side wall 375 of the calculating mechanism. At its lower end the slide 421 is slidably attached to the machine frame 1 by means of an elongated slot 427 and a screw 428. By means of a spring 429 hung, on the one side, to a pin 430 of the slide 421 and, on the other side, to a pin 430a of the machine frame 1, the slide 421 is continually pulled with the upper ends of its slots 425 and 427 against the screws 428 and 428, whereby the normal position of the slide 421 is determined. A lever 431 is swingable round a headed screw 432 screwed into an angle member 433 (Figs. 13 and 15) which in turn is screwed to the outside of the side wall 375 of the calculating mechanism by means of screws 434. The lever 431 projects with its forward arm 435 through a slot 436 of the slide 421, while its rearward arm 437 projects through a corresponding slot of the side wall 375 of the calculating mechanism. The lever 431 is capable, by means of its arm 437 to act on the locking pawl 415.

In the operation depressing the total-taking key 17 and swinging the total-taking key lever 70, this lever 70 acts with its arm 79 on the lower end 294 (Figs. 13, 15, 19) of the slide 293, thereby pushing the slide 293 upwards against the action of its spring 310. Consequently, the angle lever 300 is swung in a clockwise direction round the pivot screw 302, this movement being transmitted by means of the fork-shaped arm connection 303, 304 to the slide 305, displacing same towards the right hand side. The slide 305 now acts with the inclined face 436 of its nose 311 on the zero stop 312 and with its fixing lever 314 (Fig. 19) swings said stop against the action of its spring 319 in an anti-clockwise direction round its pivot shaft 200. Thereby the zero stop gets into working position in relation to the zero setting wheels of the complement totalizing mechanism 8 situated in calculating position.

When starting the rotary movement of cams 85 and 289 in a clockwise direction, the release slide 399 slides on the downwardly inclined curve portion of the cam 289 against which the slide 339 is pulled by means of its springs 342 and 343. When moving downwards, the release slide 339 acts with its inclined face 220 (Figs. 20 and 21) against lug 389 of the lever 390 and swings the same and together with it the lever 392 and shaft 224 against the action of spring 226 of the lever 227 (Fig. 14) in a clockwise direction. In virtue of this, also the levers 229 to 232, 242, 234, 263 and 325 fast on shaft 224 are swung in the same direction. By displacing the lever 242 (Fig. 18) the calculating mechanism gear is unlocked by the releasing pawl 242 from the wheel 243. The lever 231 being in working position to the unlocking lever 233 (Fig. 28) of the hundreds place of the complement totalizing mechanism 8, now acts on the said lever 233 and unlocks thereby the driving member of the hundreds place of the said totalizing mechanism. The lever 263 (Fig. 19) is hereby caused to swing freely without acting on any other members, since the lever 261 has become inoperative in relation to the lever 263 as the complement totalizing mechanism 8 moves into calculating position. By swinging the lever 325 the forward, upwardly slanting end 321 of the lever 320 is pushed through the guide slot 322 of the front wall 214 of the calculating mechanism and hereby the lever 320 causes the slide 305 to swing slightly round the screw 307 (Fig. 19) in an anti-clockwise direction. In virtue of this the slide 305 acts by its nose 311 repeatedly on the zero-stop 312 and causes it to swing with its lever 314 against the action of the spring 319 further in an anti-clockwise direction round the shaft 206. Hence, the zero-stop 312 arrives in the definite working position in relation to the zero setting wheels 441 of the complement totalizing mechanism 8, whereby the said wheels 441 are aligned in the manner described under the heading "Total-taking process in the complement totalizing mechanism". Directly at the beginning of the said swinging movement of the lever 390, the pin 389 of said lever 390 acts on the lever 400, swinging the same and its associated members 401, 402, 403, 408 and 405 against action of the spring 412 (Fig. 23) in a clockwise direction. Hereby the wheel 408 is cause to engage with the teeth 414 (Figs. 20 and 22) of the zero-setting slide 352b. The locking lever 415 acts hereby on the pawl 416 and causes it to swing round the pivot pin 418 against the action of its spring 422 in a clockwise direction and the pawl 416 is pulled back, at the termination of the swinging movement of the pawl 415, into its normal position, by means of the spring 422, locking thereby with its locking nose 439 the locking lever 415 and the members associated therewith in the working position, whereby the toothed wheel 408 is held in engagement with the teeth 414 of the zero-setting slide 352b. As soon as these operating processes, which were started immediately at the commencement of the downward movement of the release slide 339, are finished, the said slide 339 acts, in its further downward movement, by means of its stop member 308 on the pawl 382 and causes it to swing together with the pawl 300 round the pivot rivet 381 in a clockwise direction against the action of the spring

387. Hereby the pawl 380 is disengaged from the locking teeth 378 of the angle member 378, releasing thereby the zero-setting slide 352b for a downward movement. Now the toothed wheels 367 and 369 are rotated, under the action of a spring-operated slide 373, 466 (Fig. 24), which co-acts with the toothed wheel 369, in a clockwise direction, the rotary movement of the toothed wheel 367 being transmitted to the zero-setting slide 352b. In virtue of this, the zero-setting slide is moved downwards acting in turn on the toothed wheel 408 and rotating same together with the shaft 240 also in a clockwise direction. This rotary movement is transmitted, by means of the driving members 251 and 274, to the shaft 208 and the driving wheel 216, whereby the driving wheel 216 is caused to rotate in an anti-clockwise direction. During the rotary movement the driving wheel 216 acts on the driving members of the hundreds place of the complement totalizing mechanism 8 limiting the movements. In the said downward movement of the zero-setting slide 352b, the lever 345 of the eccenter disc 351 is of course also acted on, causing it to swing around its pivot screw 347 in a clockwise direction against the action of the spring 352a. The stop 346 releases the lever 345 for this movement already at the start of the downward movement of the release slide 339. After the release slide 339 has been moved, during the further downward movement with its stop member 388 past the pawl 382 the pawls 382 and 380 return to their normal position under the action of the spring 387. Hereby the pawl 380 is put into engagement with the locking tooth 379 located exactly opposite to it at the termination of the downward movement of the zero-setting slide 352b, thereby preventing the zero-setting slide 352b from moving downward further than the respective end position. During the further downward movement of the release slide 339 it will act on members for the purpose of preparing the typing process.

Total-taking process in the complement totalizing mechanism

In addition to the driving wheels 256 described under the heading "Normal calculating and typing operation taking place when making booking entries in the columns I to III of the form" intermediate wheels 257 and number rollers 258, the complement totalizing mechanism 8 is provided with the zero-setting wheels 441 interposed before the driving wheels 256, and being capable of co-operating by means of the zero-setting noses 442 with the zero stop 312 described under the heading "total-taking process in the calculating mechanism". The zero-setting wheels 441 are further provided with teeth 443 of half the normal height, capable of controlling a clear sign feeling member 444, which is swingably mounted between the side members of the complement totalizing mechanism 8 by means of the pins 445 and is held by means of a spring 446 in the rest position shown in Fig. 28. By means of a nose 447 the clear sign feeling member 444 is capable of acting on parts 448, 449, 450 (Figs. 28, 29) of a clear sign key locking device. Further, the complement totalizing mechanism 8 is provided with the intermediate wheels 451 and complement number rollers 452 and with the members 453, 454 and 455 (Fig. 29) for changing over to the complement number rollers, said members being actuated by means of a hand lever 456 in a manner described under the heading "Total taking by addition". When changing over the lever 456 and with it the flap 453, the flap 453 acts by means of a nose 457 on an arm 458 of the swingable control plate 275, described under the heading "Automatic total taking" and places the same into working position to the lever 278 (Fig. 19). The complement totalizing mechanism 8 is also fitted with a lever 459 capable of acting by means of a nose 460 on a rod system described under the heading "Return of carriage" for the purpose of releasing automatically the carriage return device.

Hence, if the driving wheel 255 of the hundreds place of the complement totalizing mechanism 8 is rotated by one revolution by means of a driving wheel 218, which, is rotated in an anti-clockwise direction when the zero-setting operation is started, the driving wheel 255 of the hundreds place is acted upon in the clockwise sense and its movement is transmitted to the associated number roller 258 and the associated zero-setting wheel 441. Hereby the number roller 258 is rotated in a clockwise direction and the zero-setting wheel 441 in the anti-clockwise direction. Whereas, according to the value "417.95" to be withdrawn a "4" is shown in the hundreds place of the complement totalizing mechanism 8, that is since four units have been registered in the same, the zero-setting tooth 442 is to be rotated through four units. Therefore, the zero-setting wheel 441 is also moved backwards through four units in the above mentioned rotary movement, until its zero-setting tooth 442 strikes against the zero stop 312 whereby the movement of all parts operatively connected therewith is limited. The movements of the driving members 210, 274, 251 (Figs. 28 and 18), 408 (Fig. 20) 414, 352b, 366, 367, 369 of the calculating mechanism therefore comprise, according to the above statement, also four units. In the zero-setting process the zero stop co-acts with the zero-setting wheels 441 as follows: The toothed driving segment of the zero-setting wheel of the hundreds place to be written clear in the complement totalizing mechanism 8 is hereby rotated without hindrance through a recess 461 (Fig. 19) of the zero stop 312 until its zero-setting tooth 442 strikes against the nose 462. The zero stop 312, if placed into operating position to the zero-setting wheels, engages by means of its noses 463 and 464 the teeth of the zero-setting wheels of the next higher or lower places. Hereby the zero-setting wheels 441 are aligned and positively retained in the position of alignment so that the unavoidable clearance in the other driving elements is not increased by the zero-setting wheels. Hereby in turn it is prevented that by excessive throw in the zero-setting operation a transfer is caused to the place next higher or lower to the calculating place to be set to zero. As soon as zero has been struck the number roller of the hundreds place of the complement totalizing mechanism stands on zero.

Preparing the typing operation in the total-taking action

The wheel 369 meshes with a slide 373 (Figs. 15, 20 and 24) by means of the teeth 465. A further slide 466 guided between bent-off lugs 467 of the slide 373 and screwed to the same by means of the screws 468, is in engagement with a toothed wheel 469 fixed on a shaft 470. The slides 373 and 466 are relatively adjustable by means of the slots 471 provided in the slide 466 and, when screwed together, act as one slide. The slide 373 is laterally guided in a slot 472 (Fig. 20) of the

bearing angle member 372 and is maintained with the teeth 465 in the required engagement to the toothed wheel 369 by means of a screw 473 projecting through a slot 474 of the slide 373 and screwed into the angle piece 372. The slide 466 is maintained in the required engagement of its teeth 475 with the toothed wheel 469 by means of a slot 476 and a headed screw 477 (Fig. 24) projecting through said slot and screwed into the angle member 478. Hereby the slide 466 is at the same time laterally guided between the angle member 478 and the head of the headed screw 477. A spring 479 (Figs. 15 and 24) attached on the one side to an eye 480 of slide 466 and on the other side to a pin 481 fixed to the machine frame 1 acts continually on the slides 480 and 373 in the direction of the arrow 482 (Fig. 15), which movement in the position of rest is limited in the respective position by intermediation of the gear members 388, 367, 368, 352 through the cooperation of the locking pawl 380 with the ratchet teeth 379 (Fig. 20) of the angle member 378. The bearing angle member 478 is screwed to the left hand outside of the machine frame 1 by means of screws 483 (Figs. 15 and 24). The shaft 470 is rotatably supported on the one side by a center punch screw 484 screwed into a bent-off portion 485 of the bearing angle 478, said center punch screw being adjustable and fixable in said bent-off portion by means of a nut 486. On the other side, the shaft 470 is rotatably supported by a center punch bolt 487 riveted into a bearing angle 488, which is screwed to the inside of the back wall of the machine frame 1 by means of screws 489 (Figs. 15, 24 and 26). The shaft 470 with the toothed wheel 469 projects through a corresponding bore of the bearing angle member 478. Fixedly mounted on the shaft 470 is also a notched wheel 490 (Figs. 15, 24 and 26) which co-acts with a roller 491 of a lever 492, which lever is swingably mounted by means of a hub 493, on the shaft 494 of a swinging frame, the lever 492 is held laterally non-displaceable between a lever 495 also associated with the said swinging frame and a guiding angle member 498. By means of a spring attached on the one side to a pin 498 of the lever 492 and on the other side to a pin 499 of an arm 506 of the lever 495, the roller 491 is continually held in working position in relation to the notched wheel 490. The guiding angle member 498 screwed to an arm 500 of the lever 495 by means of the screws 501, limits the swinging movement of the lever 492 due to the action of the spring 497, if the roller 491 is removed from the working position in relation to the notched wheel 490. Further, on the shaft 470 there are fixedly mounted twelve noses 502 (Figs. 16, 24 and 26) arranged in the form of twelve symmetrical spokes of a wheel i. e. displaced by 30° each to one another. Associated with said noses 502 are twelve angle levers 503 swingably mounted on the shaft 494, and, on the other hand, associated with the number key levers 149 for the numbers "0" to "11". The number key levers 149 for the numbers "0" to "9" are associated with the totalizing slides 266, 147, as used in "Addelektra-Machines" for booking entries in Germany currency. The number key lever 148 for the numbers "10" and "11" have been provided in this case for the not represented tens and elevens totalizing slides as provided in Addelektra typewriter-calculating machines for booking entries in British currency. The angle levers 503 are arranged between the left hand lever 495 (Fig. 25) and a right hand lever 504 of the hereinafter described swinging frame 495, 494, 504 on the shaft 494 of the latter and are laterally spaced from one another as required by means of tubular distance members 505. Guided in corresponding slots 506 of a guide bar 507 (Figs. 16, 26) by means of the arm 508 (Fig. 24), are the angle levers 503, standing with their arms 508 within the reach of the bent-off portions 559 of the number key levers 149 corresponding to the numbers "0" to "11." By means of the springs 510 attached on the one side to the arms 508 of the angle levers 503 and on the other hand to the bent-off noses 511 of the guide bar 507 the arms 508 of the angle levers 563 are continually pulled against the forward ends of the guide slots 506 and hereby are held out of working position in relation to the bent-off portions 509 of the number key levers 149. The guide bar 507 is screwed by means of the screw 512 to the bent-off portion 514 (Figs. 15 and 26) of the bearing angle piece 488 and on the other hand is screwed to a fastening angle 515 by means of a screw 518. The fastening angle 515 is screwed to the inside of the machine frame 1 by means of the screws 517. The noses 502 fast on the shaft 470 are within the reach of the arms 518 of the angle lever 503. As long as the parts of the mechanism are in the rest position, the nose 502 associated with the angle lever 503 or the number typing key lever 149 for the number "0," respectively, is in working position to the arm 518 of the said angle lever 503. The other noses 502 are put in to working position in dependence on the zero-setting process, i. e. the nose 502 corresponding to the value placed on zero in the respective case is brought into working position to the arm 518 of the associated angle lever 503. The release slide 339 described under the heading "Total-taking process in the calculating-mechanism" is capable of acting by means of its pin 519 on an arm 520 (Fig. 25) of a lever 521 arranged swingably on a screw 522 screwed into a bearing angle 523 (Fig. 15). The lever 521, when operated, is capable of acting, by means of an arm 524 on a bent-off portion 525 of a slide 526. The slide 526 is attached on an arm 527 of the lever 495 by means of the slots 528 and headed screws 529 so as to be axially shiftable, and is adapted to engage by means of a bent-off portion 530, a slot 531 of the lever 532. A spring 533 attached on the one side to a pin 534 of the slide 526 and on the other side to a bearing or pivot bolt 496 of the lever 495, continually pulls the slide 526 in its position of rest against the headed screws 529 with the forward ends of its slots 528, whereby its bent-off portion 530 is held out of working position in relation to the slot 531 of the lever 532. The lever 532 is mounted vertically shiftable at the inside of the bearing frame 15, by means of a slot 535 and a screw 536 and is jointed by means of an arm 537 and a headed screw 538 to a lever 539. The inclined upper end 540 of the arm 524 of the lever 521 has been provided for the following reason: In the Mercedes Addelektra machine the machine frame 1 may be swung away from the bearing frame 15 upwards and rearwards. By this swinging movement the bent-off portion 525 of the slide 526 is moved out of working position to the arm 524 of the lever 521, whereby the lever 521 drops by its own weight on the bearing of the shaft 87 and with its arm 524 is placed into the path of movement of the bent-off portion 525 of the slide 526. Now, if the machine frame 1 is swung back,

the bent-off portion 525 slides along the inclined face 540 of the arm 524 of the lever 521 and swings the lever 521 back again into the position illustrated in Fig. 15.

Now, if the wheels 367 and 369 (Fig. 20), under the action of the spring 479 are rotated in a clockwise direction as described under the heading "Total-taking process in the calculating mechanism" in connection with the setting process, which movement comprises four units, this movement is transmitted, under action of spring 479 by means of the toothed slides 373 and 466, to the toothed wheel 469 and thereby to the shaft 470. Accordingly, the shaft 470 and the noses 502 (Figs. 16 and 24) fast on it are also rotated further in the clockwise direction by an amount corresponding to four units. Hereby the nose 502 associated with the angle lever 503 or the number key lever 149 for the number "4," respectively, is placed into working position to the arm 518 of the said angle lever 503. In order to ensure that the selected nose 502 is actually placed into working position and in order to avoid any excess movement due to clearance in the driving gear or in order to compensate for the same, the notched wheel 490 (Fig. 15) in the said rotary movement of the shaft 470 co-acts with the roller 491 of the locking lever 492. In the further downward movement of the release slide 339, said slide acts by means of pin 519 on the arm 520 (Figs. 15 and 25) of the lever 521 and swings same round the bearing screw 522 in a clockwise direction. Hereby the lever 521 with its arm 524 acts on the bent-off portion 525 of the slide 526 and displaces it against the direction of arrow 90 (Fig. 25) against the action of the spring 533. Accordingly, the lug 530 of the slide 526 is caused to engage with the slot 531 of the lever 532 whereby the driving connection is secured between the lever 532 and the lever 495 of a swinging 495, 494, 504.

Typing process

The cam 85 described under the chapter "Preparing the total-taking process by depressing the total-taking-key" is capable of acting, in its rotary movement, on an arm 541 of a lever 539 (Figs. 15 and 25), which is held in operative connection with the above described lever 532 by means of the screw 536. The lever 539 is swingably mounted, by means of a headed screw 542, at a bearing angle member 543 screwed in turn to the inside of the bearing frame 15 by means of screws 544 (Fig. 15). A spring 545 attached on the one side to a pin 546 of the bearing angle 543 and on the other side to a pin 547 of the lever 539 pulls the lever 539 with its arm 541 continually against the cam 85. A swinging frame 495, 494, 504 formed by the levers 495 and 504 and the shaft 494 is swingably mounted in the bearing frame 15 on the one side by means of a pivot bolt 496 and on the other side by means of pivot bolt 548, the pivot bolts 496 and 548 being fixed to the side members of the bearing frame 15 by means of the screws 549 Fig. 15. A shaft 550 fixed in arms 551 and 552 of levers 495 and 504 serves to stiffen the said swinging frame. A further means of stiffening the swinging frame 495, 494, 504 is provided by shaft 553, which is fixed to an arm 500 of the lever 495 on the one side and to an arm 554 of the lever 504 on the other side. The swinging frame 495, 494, 504 is swung continually round the pivot bolts 496 and 548 in an anti-clockwise sense by means of a spring 555 attached on the one side to a spring attachment bolt 556 (Fig. 26) fixed to the shaft 550, and on the other side to a spring attachment bolt 556a fixed to a bearing member 557. This swinging movement is limited by the lever 504 striking against a screw 558 screwed into the bearing member 557, whereby the position of rest of the swinging frame 495, 494, 504 is determined. If now, in the further rotary movement of the cams 289 and 85 the cam 85 with its elevated part 559 acts on arm 541, the lever 539 (Figs. 15 and 25) is swung round the bearing screw 542 in a clockwise direction against the action of its spring 545, the jointed lever 532 participating in this movement. In the downward movement of lever 532 hereby effected, the slide 526 and, accordingly, the swinging frame 495, 494, 504 are also acted upon owing to the driving connection 530, 531 previously established. Accordingly, the swinging frame 495, 494, 504 is swung round the bearing bolts 496 and 548 in a clockwise direction against the action of the spring 555, whereby the angle levers 503 mounted on the shaft 494 of the said swinging frame are raised. Since the nose 502 associated with the typing number key lever 149 for the numbers "4" has been placed into working position to the arm 518 of the angle lever 503 also associated with the typing number key lever 149 for the numbers "4" in connection with the zero-setting operation, the arm 518 of this angle lever 503 strikes against the said nose 502 immediately at the commencement of the said swinging movement of the swinging frame 495, 494, 504 or at the start of the upward movement of an angle lever 503, respectively. Hence this angle lever 503 is swung, with the further swinging movement of swinging frame 495, 494, 504 round the shaft 494 in an anti-clockwise direction against the action of its spring 519, whereby it is placed with its arm 508 into working position to the bent-off portion 509 of the number key lever 149 of number "4". At the termination of the swinging movement of the swinging frame 495, 494, 504 the arm 508 of the angle lever 503 acts on the bent-off portion of the said typing number key lever 149, whereby the latter is swung round its bearing bar 259 in a clockwise direction against the action of its spring 560. Hereby the driving connection is established by means of the intermediate member 151 between the cam shaft 153 continually driven by the motor 18 and the draw lever 152, whereby the type lever 154 for the number "4" is swung over the intermediate lever 155, and the number "4" is written down in column IV of form 200. When type lever 154 falls back, the carriage step locking device (not shown) is acted upon, whereby the carriage is unlocked for a movement to the left hand side corresponding to one carriage step. Hereby the complement totalizing mechanism 6 is placed into calculating position with the next lower place.

In the further rotary movement of the cams 289 and 85 the following mechanisms are also actuated by means of the cam 85.

The cam 85 is capable of acting on a roller 99 (Figs. 13 and 27) arranged on a shaft 100 of a swinging frame 100, 101, 102, 103, 104 (Figs. 17 and 27). The said swinging frame is swingably mounted by means of its shaft 104 in a bearing bridge 562 and bearing angles 563, which, in turn are fixed to a bridge 564 (Figs. 17 and 15) of the bearing frame 15. A lever 173 fixed to a shaft 565 is in operating or driving connection with the swinging frame 100, 101, 102, 103, 104 by means of levers 167 and 168 also fixed to the shaft 565. This shaft 565 is swingably supported on the one side in the bearing angle 523 and on the other

side in a bearing angle 566, whereby the bearing angles 525 and 565 are fixed to a shaft 107 supported in the bearing frame 15 and to a bridge 584 of the bearing frame 15.

The lever 173 is capable to act, during the actuation of the said swinging frame upon the mechanism described under the heading "Operation of a device having a spring urged carriage controlled by an escapement".

By means of a roller 105, which is arranged on the shaft 100 the swinging frame 100, 101, 102, 103, 104 acts upon the levers 106 and 111, whereby the mechanisms, described under the heading "Operation of the comma skipping device for skipping the comma place during the automatic total taking" are actuated.

The shaft 100 is extended at the left hand side and projects through a slot 567 over the bearing frame 15. At the outside of the bearing frame 15 a lever 568 is fixed on the shaft 100, which lever is jointed, by means of a screw 569 to a rocking device 570 (Figs. 15, 20 and 27). The rocking device 570 is swingably supported on a headed screw 571 screwed into the bearing frame 15 and by means of a bent-off member 572 it is capable of acting on the lower end 573 of the slide 421.

If now the cam 65 in its further rotary movement acts by means of its upwardly inclined part 558 on roller 69, the swinging frame 100, 101, 102, 103, 104 is swung in the bearings 502, 503 in a clockwise direction. In this movement also participate the members 107, 108, 107 and 173, whereby the lever 173 is swung in the bearings 523 and 580 in an anti-clockwise direction against the action of the spring 108. Hereby the lever 173 acts on an automatic or forced motion carriage shift as described under the heading "Operation of the device having a spring urged carriage by an escapement."

The swinging frame 100, 101, 102, 103, 104 also acts in the said swinging movement, by means of its roller 105 on the lever 106 and thereby also on the lever 111, whereby the distance bridging device described under the heading "Operation of the comma skipping device for skipping the comma place during the automatic total taking," is actuated in the comma place of the complement totalizing mechanism.

Returning the actuated mechanisms

Moreover, in the said swinging of the swinging frame 100, 101, 102, 103, 104 the lever 560 fixed to the extended left hand end of the shaft 100 is also acted on. Accordingly, the rocking device 570 is swung round a screw 571 (Figs. 15 and 20) in a clockwise direction, whereby its bent-off portion 572 acts on the slide 421 and displaces same upwards against the action of the spring 420. Hereby the arm 419 of the locking pawl 416 is lifted against the action of the spring 422, and said pawl 416 is swung around the bolt 418 in a clockwise direction. In consequence of the locking lever 415 is disengaged by pawl 416 so that the lever 415 and the parts 401, 400, 402, 403 and 408 (Fig. 23) associated with said lever are swung into normal position by action of the spring 412. In case, however, the friction between the tooth flanks of the tooth wheel 400 and the flanks of the zero-setting slide teeth 414 meshing with the wheel 400 is so great that the tooth wheel 408 does not disengage itself from the teeth 414 of the zero-setting slide 352b by the action of spring 412. This disengagement takes place by forced motion through the lever 431. The lever 431 is automatically swung, during the said displacement of the slide 421 and owing to the driving connection 421, 435 (Figs. 15 and 20), round its bearing screw 432 in a clockwise direction, acting hereby through its arm 437 on the locking lever 415, whereby said lever 415 and the parts 401, 400, 402, 403 and 411 associated with it are automatically swung back into their normal position.

In the further rotary movement of the cams 260 and 85 the cam 289 acts with its upwardly inclined curved portion on the roller 344 of the release slide 339, which is hereby again raised against the action of the springs 342 and 343. Hereby it acts by means of the stop 346 on the lever 345 (Figs. 15 and 20) and through this in turn on the zero-setting slide 352b, whereby said slide 352b is also raised and returned into its normal position. Hereby the locking pawl 380 slides along the locking teeth 379 of the angle piece 378 of the zero-setting slide 352b so as to retain the said slide 352b and thereby also the release slide 302b in the normal position. In the return movement of the zero-setting slide 352b participate also the parts 387, 388, 373, 406, 409, 476, 490 and 502 which return to their normal position against the action of springs 478 and 497. Accordingly, also the swung lever 503 is returned to its normal position by action of its spring 510, whereby also the bent-off part 589 of the key lever 149 acted on by lever 503 is released and the key lever 149 is swung back into its normal position by action of its spring 560. In the meantime the cam 65 in its further movement has been placed, with its downwardly inclined curve portion, into the reach of the arm 541 of the lever 539, whereby the said lever 539 is returned to its normal position by action of its spring 545. Hence, the lever 532 and the swinging frame 495, 494, 504 also return to their normal position under action of the spring 555. During the further rising movement of the release slide 339 the arm 520 of the lever 521 is also disengaged again by the pin 519, so that under the action of the spring 533 the coupling 530, 531 is again disengaged. In the meantime the cam 65 has entered, with its downwardly inclined part 575, the reach of the roller 69 (Fig. 27) of the swinging frame 100, 101, 102, 103, 104 so that the said swinging frame is also swung back into its normal position by the action of the spring 190. Accordingly, also the rocking device 570 (Fig. 20) returns to its normal position, and in this return movement participate also the slide 421 and the lever 416 and 431 by the action of the springs 429 and 422. The other mechanisms actuated by the swinging frame 100 to 104 also return to their normal position by forced motion or by action of their associated springs respectively. When the rising movement of the release slide 339 is finished, the lug 389 of the lever 390 is again disengaged by the inclined face 220 of the release slide 339. In virtue of this the levers 390 and 392 and the parts 224, 231, 220, 230, 232, 283, 227, 242 and 325 return to their normal position under the action of the spring 226 whereby the calculating mechanism and the totalizing mechanism situated in calculating position are locked again. Hereby the lever 320 is drawn backwards into its normal position. At the same time the zero stop 312 and the lever 314 are swung back somewhat in the clockwise direction under the action of the spring 319, whereby the zero stop 312 is placed out of alignment position in relation to the zero-setting wheel 441 of the complement totalizing mechanism 8, re-

maining, however, in readiness for operation therewith.

Now, as the total-taking key 17 is held depressed by means of the locking device 74, 78 which is released later on only, the total-taking lever 70 cannot act with its arm 79, at the termination of a rotation of the cams 289, 85 on the coupling pawl 81, so that the pawl 81 is not uncoupled from the shaft 87. Consequently, the cams remain coupled to the shaft 87 for another revolution, during which the operations are repeated. Owing to the carriage step movement started before, the next lower place of the value "417.95," that is the "1" is not withdrawn from the complement totalizing machanism 8 and written down in the column IV of form 208. Thus, by further revolutions of the cam discs 289 and 85, the complement totalizing mechanism 8 is automatically "written clear," one place after the other, whereby the operations are repeated in each calculating place. The comma place is bridged over by means of a comma bridging device, described under the heading "Operation of the comma skipping device for skipping the comma place during the automatic total taking," whereby one carriage step is caused to take place. If now during this automatic clear writing of the complement totalizing mechanism 8 the carriage step released in the lowest place of the complement totalizing mechanism is performed, the complement totalizing mechanism 8 acts on the pawl 336 of the lever 330 (Figs. 13 and 19) by means of the nose 576 (Figs. 13, 14 and 28) of the bent-off part 209 of its fastening metal sheet 210, whereby the lever 330 is swung around the bearing bolt 331 in an anti-clockwise direction against the action of the spring 334. Hereby the bar 326 is moved downwards pressing with its lower end 327 on the arm 284 (Fig. 15) of the locking lever 73. Hereby the locking lever 73 is swung around its bearing screw 77 in an anti-clockwise direction against the action of the spring 76, whereby the locking lever 73 with its arm 74 is removed again from its operating position in relation to the groove 78. Consequently, the total-taking key lever 70 swings in an anti-clockwise direction round shaft 72 back into its normal position by action of the spring 283, whereby it moves again with its arm 79 into the path of movement of the coupling pawl 81. Hereby the said pawl 81, at the termination of the induced rotation of the cams 289, 85 is removed from engagement with the coupling wheel 83 by striking the arm 79 of the total-taking lever 70 against the action of the spring 82, whereby the rotary movement of cams 289, 85 is stopped. In this return movement of the total-taking key lever 70 participate also the levers 89 and 93 (Fig. 27) thus also returning to their normal position. The members 293, 300 and 385 (Fig. 19) also follow this return movement of the arm 79 of the total-taking key lever 70 and move back into their normal position by action of the spring 310. Hereby the zero stop 312 slides off again from the inclined face 438 of the nose 311 of the slide 305, returning again, under action of its spring 319, into its normal position determined by its contact on the nose of the slide 305. In this position the zero stop 312 is again definitely out of working position in relation to the zero-setting wheels 441 of the complement totalizing mechanism 8. The lawl 336 is acted on for a short time only during the above mentioned carriage step movement and is at once released again by the nose 576 of the fastening plate 210 of the complement totalizing mechanism 8. Therefore, the parts 330 and 326 are also acted on for a shoft time only and return to their normal position immediately under the action of the spring 334.

Clear sign printing

Further, in the above mentioned carriage step the clear sign flap 444 (Figs. 28 and 29) acts by its nose 447 on the pin 448 of the locking lever 449 for the clear sign key 577 (Fig. 14). Hereby the lever 449 is moved from its locked position into its unlocked position, if all number rollers of the complement totalizing mechanism stand on zero, that is if the clear sign flap 444 co-acts with the short teeth 443 of the zero-setting wheels 441 (Fig. 28) so that in this position of the members the clear sign key 577 may be depressed. If, however, not all the number rollers of the complement totalizing mechanism 8 have been set on zero, the clear sign flap co-acts with the normal teeth of the zero-setting wheels 441 and the locking lever 449 is swung out of its locking position into its other locking position. Hence, the clear sign key 577 cannot be pressed down.

Return of carriage

If now the complement totalizing mechanism has been written clear, the clear sign key 577 is depressed, whereby the clear sign is printed by means of a type lever associated to this key. With the carriage step released when the clear sign type lever falls back, the nose 460 of the lever 459 of the complement totalizing mechanism 8 acts on a nose 578 of a lever 579 (Fig. 30) and displaces same to the left hand side, whereby an angle lever 580 is swung in an anti-clockwise direction round a screw 581 against the action of a spring 582. Hereby a carriage return coupling is automatically closed. The carriage return coupling and the associated linkage are not illustrated in the present application, because they are described and shown in the U. S. Patent 2,046,524 in which patent the carriage return coupling is indicated with the characters 171, 172, 173, 175, 174 (Fig. 3) 176 (Fig. 1). At the termination, therefore, of the clear writing process of the complement totalizing mechanism 8 the carriage return mechanism is automatically actuated. With the right hand side movement of the carriage connected with the above operation, the levers 261, 264 and 278 (Figs. 14 and 19) are acted on by the associate control plates of the totalizing mechanisms 5 to 8, without, however, causing any further action. The pawl 336 (Figs. 13 and 19) is hereby acted on by the noses 279 and 574 of the fastening plates 210 of the said totalizing mechanisms, whereby said pawl 336 is swung in a clockwise direction round the bearing screw 325 against the action of its spring 338, without acting on any other parts.

Rendering the carriage return mechanism ineffective

In order to render the mechanism as described under the heading "Return of carriage" for automatic operation of the carriage return mechanism ineffective when displacing the paper carriage by hand by actuating the carriage release lever 201 (Figs. 15 and 16) and when depressing a tabulator key of the tabulator keys 14 (Fig. 16), the following rod system is actuated.

When depressing the carriage release key 201 or a tabulator key 14, the carriage step lock is rendered ineffective, hereby a shaft 583 (Fig. 30) is swung in an anti-clockwise direction; where-

by a lever 584 fixed to shaft 563 is swung in the same direction against the action of a spring 585 (Figs. 16 and 30). Another rod 586 jointed to said lever 584 acts hereby on a lever 587 and swings it round a bearing screw 588 in a clockwise sense. In virtue of this an angle lever 589, which is in driving connection with the lever 567 by means of a bar 590, is swung round its pivot 591 in a clockwise direction. Hereby the lever 578 is acted on by a pin-slot connection, being caused thereby to swing round its jointing point 592 in an anti-clockwise direction. Thereby the stop nose 578 of the lever 578 is moved out of working position in relation to the nose 460 of the lever 458 of the complement totalizing mechanism 6 (Fig. 29).

Total-taking by addition

In writing out a new credit balance calculated in the complement totalizing mechanism 6, that is a negative value, for example the value "302.85" of column IV of form 200 on the second writing line the following mechanisms are likewise actuated besides the mechanisms.

In calculating the new credit-balance "302.85" in the complement totalizing mechanism 6 the capacity of this totalizing mechanism is exceeded, therefore the totalizing mechanism is changed-over by the operator of the machine to the complement number rollers. This is done by throwing-over the hand lever 456 (Fig. 29). Hereby the flap 453 is displaced downwards by the double toothed-segment 454, the fugitive "1" being at the same time introduced by means of the toothed segment 435. By the said displacement of the flap 453 the number rollers 256 are covered up, whereas the complement number rollers 452 (Fig. 28) are uncovered. Moreover, the flap 453 acts, in this displacement action, by its nose 457 on the arm 459 of the swingable control plate 275 and causes same to swing round its pivot 276 in an anti-clockwise direction against the action of its spring 277. Hereby the control plate 275 is brought into working position to the angle lever 270 controlling the coupling for the driving wheels 206 and 207.

Jointed to an arm 593 of the angle lever 270 is, in addition to the rod system 594 (Fig. 14) for the coupling sleeve 205, a rod 595 (Figs. 13, 19) by means of a screw 596 projecting from the right hand side wall 597 of the calculating mechanism 10 and being guided in a corresponding recess of same. By means of a bent-off end portion 598 the rod 595 is capable of acting on a lug 599 of a lever 600 (Figs. 13 and 31), which lever is mounted, so as to be swingable and displaceable upwards, by means of an elongated slot 601, on a headed screw 602 which in turn is screwed into a bearing angle member 603, which, on the other hand, is screwed to the side wall 597 of the calculating mechanism by means of a screw 604. The upper end of the lever 600 is jointed to an arm 605 of a lever 606 by means of a headed screw 607, the end of the lever 600 with the headed screw 607 being laterally displaceable in a slot 608. By a spring 609 attached on the one side to a spring attachment lug 610 and on the other side to a pin 611 fixed to the side wall 597, of a calculating mechanism the lever 600 with its screw 607 is acted on continually against the left side end of slot 608 of lever 606, whereas on the other hand the lever is continually acted on by the spring 609 against the screw 602 by means of the upper end of the slot 601, whereby the normal position of the lever 600 is determined. The lever 606 is swingably pivoted, by means of a hub 612, on a headed screw 614 screwed into the front wall 214 of the calculating mechanism and is jointed to a key lever 615 by means of a slot 616 and a headed screw 617 screwed into the key lever 615. The key lever 615 is swingably mounted on the front wall 214 of the calculating mechanism, by means of a headed screw 618 and is capable of being actuated by means of a key 619 associated to it, for the purpose of changing over the type of calculation in the calculating mechanism. The key lever 615 is jointed by means of a screw 620 (Fig. 30) to a further lever 621 swingably mounted at the inside of the front wall 214 of the calculating mechanism on a bolt 622 and continually pulled in its position of rest again a stop pin 623 of the front wall of the calculating mechanism by means of a spring 624. By means of a pin 625 the lever 621 engages in a slot 626 (Fig. 19) of the lever 288 with which the lever 621 is capable of cooperating. Moreover the key lever 615 is jointed by means of the same screw 620, to a bar 627 (Fig. 30) which is in driving connection to a key lever 628 of the left hand shift key 12 by means of a slot 629 and a headed rivet 630. At the left hand side wall 375 of the calculating mechanism a locking lever 631 is swingably mounted by means of a headed screw 632, which locking lever is capable of locking, by means of a locking nose 633, the key lever 615 in its working position. A spring 634 attached on the one side to lever 631 and on the other side to a pin 635 of the side wall of the calculating mechanism acts continually on the locking lever 631 against the key lever 615. The locking lever 631 is further guided by means of a slot 636 and a headed screw 637 and is capable of being actuated by hand by means of an associated key 638.

The locking lever 631 is capable of being actuated also automatically by depressing the carriage release key or one of the tabulator keys of the tabulator keyboard 14, for which purpose the following elements are provided. A rod 639 (Fig. 30) embraces with its end 640 bent into hook-shape, the lower end of the locking lever 631, which thereby strikes against a pin 641. By means of a rocking device 642 and the screw 643 and 644 the rod 639 in driving connection with a further rod 645, the rocking device 642 being swingably mounted on a screw 646 screwed into the machine frame 1. The bar 645 is jointed, by means of a screw 647 to a lever 648, which in turn is mounted on the shaft 583, described under the heading "Rendering the carriage return mechanism inoperative" by means of a hub 649 and the screws 650 and 651.

Carriage change-over mechanism

The lower end 652 of the lever 600 described under the heading "Total-taking by addition" (Fig. 31) is bent to U-shape, one bent-off portion 653 being formed to fork-shape and embracing a member 654. The member 654 is hingedly connected to an arm 655 of a lever 656 by means of a pin 657 and the lever 656 is in turn swingably mounted on shaft 72. A further lever 658 is also swingably mounted on shaft 72 and is capable of co-acting, by means of a roller 659, with a curve portion 660 of a cam 661 under action of a spring 662 continually pulling the lever 658 against the curve portion 660. The lever 658 is capable also to act by means of the nose 663 on a bent-off portion 664 of the U-shaped end 652 of the lever 600. The part 654 of the lever 656 is capable of acting

on a bent-off portion 665 of the lever 656, on which is moreover acted upon by a further lever 667 which is rigidly connected to the shift key levers 628 by means of a shaft 668. By means of a lever 669 in driving connection with lever 666 the cam 661 is coupled, if lever 666 is actuated, to the continually rotating shaft 67 by means of the coupling members 670, 671. The cam 661 by its rotary movement is capable of acting on a lever 672 and the members 673, 674 and 675 connected thereto. Hereby the levers 675 in swinging act on a shift push rod 676 for actuating the platen. By means of an arm 677 the lever 656 is in driving connection with a roller 678 fixed, by means of a rivet 679, to a bent-off portion 680 of an arm 681 of a lever 682, the arm 677 of the lever 656 being continually drawn against the roller 678, under action of a spring 683. The lever 682 is swingably mounted at the inside of the forward connecting bridge 684 of the bearing frame 15, by means of headed screw 685. By means of a pin 686 fixed to a bent-off portion 687 of an arm 688 of the lever 682 the said lever 682 extends into a corresponding bore of the total-taking key lever 76, whereby the lever 682 is placed into driving connection with the total-taking key lever 70.

Taking the total for addition

If now the complement totalizing mechanism 6 is placed into working position for the purpose of withdrawing the negative new balance "302.85" (Fig. 32) by depressing the corresponding tabulator key of the tabulator keyboard 14 the complement totalizing mechanism 6 acts, when running into this position, on the angle lever 278 (Figs. 14 and 19) by means of the control plate 275 (Fig. 28) and swings the lever 276 round its bearing screw 687 in an anti-clockwise direction against the action of its spring 688. Hereby the coupling sleeve 205 is displaced, by means of the rod system 594, jointed to the arm 593, so that the driving wheel 207 is coupled to the driving shaft 208. However, this is immaterial in this case since no totalizing mechanism is in operating position to this driving wheel. Moreover, in swinging the angle lever 276 the bar 595 is displaced to the right and hereby acts on the lug 599 of the lever 600 (Figs. 13 and 31) and swings this lever round the screw 602 in a clockwise direction against the action of the spring 606. Hereby the part 654 of the lever 656 is swung, owing to the driving connection 653, 654 round the hinge pin 657 in an anti-clockwise direction. Hence, the part 654 of the lever 656 is placed into operating position to the lug 666 of the lever 665. Further, in swinging the lever 606, it is placed with the bent-off portion 664 of the lower U-shaped end portion 652 into operating position to the nose 663 of the lever 658.

If now the total-taking key 17 is depressed, the lever 682, due to the driving connection 70, 686, is swung round the screw 685 in an anti-clockwise direction by the swinging of the total-taking key lever 70 hereby taking place. In this operation the lever 682 acts by means of the roller 678 from below against the arm 677 of the lever 656 and causes the same to swing round the shaft 72 in the anti-clockwise direction against the action of the spring 683. In this swinging movement the part 654 of the lever 656 acts on the portion 665 of the lever 666, whereby the said lever and thereby the lever 669 are also acted on against the action of the spring 689. Hence, the cam 661 is coupled to the driving shaft 67 so that the cam 661 is caused to rotate in a clockwise direction. Immediately at the commencement of this rotary movement, the cam 661 acts by means of the curved part 690 on the roller 659 of the lever 658, whereby the lever 658 is caused to swing round the shaft 72 in the clockwise direction against the action of the spring 662. The lever 658 thereby acts by means of its nose 663 on the bent-off portion 664 of the lower U-shaped part 652 of the lever 600, whereby said lever is moved upwards against the action of the spring 609. Owing to the screw-slot connection 607, 608, the lever 606 participates also in the movement of the lever 600, whereby the said lever 606 is caused to swing in an anti-clockwise direction round the pivot screw 614. By this swinging movement due to the screw slot connection 616, 617, the lever 615 and, consequently, the lever 621 and the rod 627 are also acted upon and the lever 615 is thereby swung round its pivot screw 618 in an anti-clockwise direction. Hereby the lever 615 is caused to slide off from the locking lever 631 (Fig. 30) until the said lever 631 at the termination of the swinging movement catches with its nose 633 over the lever 615 and locks the same. To this end the locking lever 631 is swung round the pivot screw 632 in an anti-clockwise direction by the action of the spring 634. The lever 621 is hereby caused to swing round the pin 622 in an anti-clockwise direction against the action of the spring 624. The lever 269 is also acted on hereby owing to the pin-slot connection 625, 626 (Fig. 19). Since the complement totalizing mechanism 6 is provided with a control plate 203 (Figs. 15 and 28), by means of which it acts, in running into calculating position, on the lever 264, the kind of calculating has been changed over from addition to subtraction by actuating the members 264, 266, 267, 268, 269, 276, 271, 272, 273 and 25. In this changed-over position the pin 267 of the part 268 is in operating position to the inclined face 690 of the lever 269. Consequently, the lever 269 acts, by the inclined surface 690 on the pin 267 of the part 268, whereby the parts 269, 270, 271, 272, 273 and 251 are acted upon in this manner, that wheel 251 is caused to engage with wheel 252. This position of engagement corresponds to the normal position of the operating members of the particular type of calculation, in which position of the parts the calculating mechanism is set for additive operation. This adjustment is necessary in this case, since the negative value "302.85" has been obtained by subtraction in the complement totalizing mechanism and can be withdrawn or written out again only by addition. The bar 627 (Fig. 30) which is pushed downwards in the swinging movement of the lever 615, acts hereby on the left hand shift key lever 628 and swings the same and the members 668, 667 and the right hand side shift key lever 628 in a clockwise direction against the action of the spring 691, without any action on other parts. During the further rotary movement of the cam 661 meanwhile taken place, the angle lever 672 and, therefore, also the parts 673, 674, 675 are acted upon, whereby said parts are caused to act on the shift push rod 676 (Fig. 17) and to effect the changing-over of the platen. Therefore, the value "302.85" is written down in inclined numbers in the typing operation. Since the total-taking key lever 70 is retained in the swung-out position until the "clear writing" process of the complement totalizing mechanism has been finished, the levers 656 and 666 are also held in their working position, whereby the cam 661, after a three-quarter revolution, is arrested by co-op-

eration of the nose 692 of the lever 666 with the coupling pawl 670. Whereas in this position of the cam 661 the parts 672 to 675 are in working position, also the platen is retained in its shift position.

If the complement totalizing mechanism 8 is now cut out of working position to the angle lever 278, regarding the control plate 275, by the carriage step released by the zero setting operation in its lowest place, the angle lever 278 returns with its associated parts 594, 205 and 595 to its normal position under action of its spring 688. Hereby also lever 690 is caused to swing partly back to its normal position round the screw 602 under action of its spring 609, in an anti-clockwise direction. Hereby the hinged member 654 of the lever 656 is again placed out of working position to the portion 665 of the lever 668, while the bent-off portion 664 of the lever 600 is again removed from its operating position to the nose 663 of the lever 658. Now, since, simultaneously with the above mentioned carriage step, the total-taking key lever is also unlocked, this lever and, owing to the driving connection 70, 686 also the lever 682 are caused to swing back into their normal position under action of the spring 283. The lever 656 also participates in this return movement, under action of the spring 663. Since the key lever 615 is still kept depressed by the locking arrangement 615, 633 and the lever 667 is therefore still retained in its swung-out position, the levers 666 and 669 cannot yet return to their normal position. Consequently, the cam 661 and the members 672 to 675 still remain in their working position, so that also the platen remains in its changed-over position. Owing to the screw slot connection 607, 606, the lever 600 is also retained in its raised position.

If now the key 636 associated with the locking lever 631 is depressed, the locking lever 631 is caused to swing round the screw 632 in a clockwise direction against the action of the spring 634, whereby the nose 633 is placed out of operating position to the key lever 615. Hence, the parts 615, 621, 269 (Fig. 19), 270, 271, 272, 273, 251, 627 (Fig. 30), 626, 666 and 667 return to their normal positions under action of the springs 624 and 691, whereby the type of calculating mechanism is changed back again to subtraction. In the return movement of the lever 615 participate also the members 606 (Fig. 31) and 600, under action of the spring. Moreover, under the action of the spring 689 also the levers 666 (Fig. 31) and 669 participate in the return movement of the lever 667 (Fig. 30). In consequence, the cam 661 is coupled again to the shaft 67, and thereby executes a further rotary movement, which is limited again, after a quarter rotation, in the normal position of the cam 661, by the cooperation of the pawl 670 and the catch of the lever 669. Hereby also the parts 672 to 675 and thus also the platen are returned again into their normal position.

In case the operator of the machine, before commencing a new booking operation, should omit to depress the locking key 638, the release in the tabulating operation required for the purpose of a new booking operation is effected as follows. In depressing a tabulator key of the tabulating keys 14 the carriage step lock is released, whereby the shaft 563 (Fig. 30) is caused to swing in the anti-clockwise direction. Hereby the lever 648 is also swung in the same direction and in this movement participate the parts 645, 642 and 639. Thereby the bar 639, which is pulled in the direction of arrow 694 (Fig. 30), is caused to act on the locking lever 631 and causes it to swing round the screw 632 in a clockwise direction against the action of its spring 634, whereby the locking device 633, 615 is released. This mechanism is actuated in the same way also when depressing the carriage release key 201.

For the rest the operations described under the heading "Total taking by addition" also take place in total-taking for subtraction.

Though the description relates to the operations of the mechanism for automatic total-taking out of the complement totalizing mechanism 8, this mechanism may, of course, also be operated in the same manner for total-taking out of the totalizing mechanism 5 and 6. In this case the key 619 of the general change-over key lever 615 is depressed by hand, whereby the lever 815 and the parts associated with it are operated. The change-over coupling is hereby actuated through the parts 627, 428, 668 and 667 (Figs. 30 and 31).

Inasmuch as the totalizing mechanism 7 is an idle mechanism, in which no values are calculated, no total-taking comes into question for this totalizing mechanism. In order to prevent the depression of the total-taking key in this case, while the idle totalizing mechanism 7 is in its working position or the form 200 is in typing position in relation to column II, respectively, the following locking mechanism for the total-taking key lever 70 is provided.

Fixed to the bent-off portion 209 of the mounting plate 210 of the idle totalizing mechanism 7 is a control member 695 (Fig. 13), by means of which the idle totalizing mechanism 7 is capable of acting on the pawl 336 of the lever 330 (Figs. 13 and 19). An angle lever 696 swingably attached to the front wall of the calculating mechanism by means of a pivot screw 697 is jointed with an arm 698 by means of a pin-slot connection 699, 700 to the lever 330. Jointed to an arm 701 of the angle lever 696 is another lever 702, by means of a pin-slot connection 703, 704, whereby the lever 702 is acted on with a bent-off portion 705 in its normal position, by means of spring 706 on its underface against the front wall 214 of the calculating mechanism, and on the other hand against the arm 296 of the lever 293. By a slot 707 of the bent-off portion 705 the lever 702 is laterally guided at a stop 708 which is screwed to the lever 293 by means of the screws 709. By means of a nose 710 of the stop 708 the lever 293 is capable of cooperating with the upper end of the slot 707 for the purpose of locking the total-taking key lever 70.

As soon and as long as the control member 695 of the idle totalizing mechanism 7 moves, during a movement of the carriage, within the reach of the pawl 336 this is hereby acted upon, whereby the pawl is caused to swing round its pivot screw 335 in a clockwise direction under the action of the spring 336, in case of the movement of the carriage to the right, i. e. in case of the winding-up movement of the carriage, without acting on any other parts. In case of a movement of the carriage to the left, the pawl 336 is depressed by the control member 695, whereby the lever 330 is caused to swing round its pivot screw 331 in an anti-clockwise direction against the action of the spring 334. In this movement participates the angle lever 696, whereby it is caused to swing round the pivot screw 697 in the anti-clockwise direction. Here-

by the lever 702 is displaced in the direction of the arrow 711 (Fig. 13) owing to the spring connection 706, so that the upper end of the slot 707 of the bent-off portion 705 of the lever 702 rests on the nose 710 of the stop 708 of the lever 293. Now, if the operator wants to depress the total-taking key 17, this is impossible for the following reason. In depressing the total-taking key 17 and in swinging out the total-taking key lever 70, the lever 70 acts by means of its arm 79 on the lever 293 and raises the same. Since the lever 293 with the nose 710 of its stop 708 stands opposite to the upper end of the slot 707 of the bent-off portion 705 of the lever 702, it is impossible to raise the lever 293. In consequence of this, the total-taking key lever 76 of course cannot be caused to swing and the total-taking key 17 cannot be depressed. Now, if one of the totalizing mechanisms 5 to 8 acts, by means of one of its noses 279, 578 on the pawl 336 and thereby on the parts 330, 696 and 702 while the total-taking key 17 is depressed and consequently the nose 710 of stop 708 is raised beyond the upper end of the slot 707 of the lever 702, the lever 702 is arrested by means of the nose 710 so that it cannot be moved along with the above named driving operation. In virtue of this, only the angle lever 096 is hereby caused to swing in the anti-clockwise direction against the action of the spring 706, which is rendered possible by the pin-slot connecton 703, 704.

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