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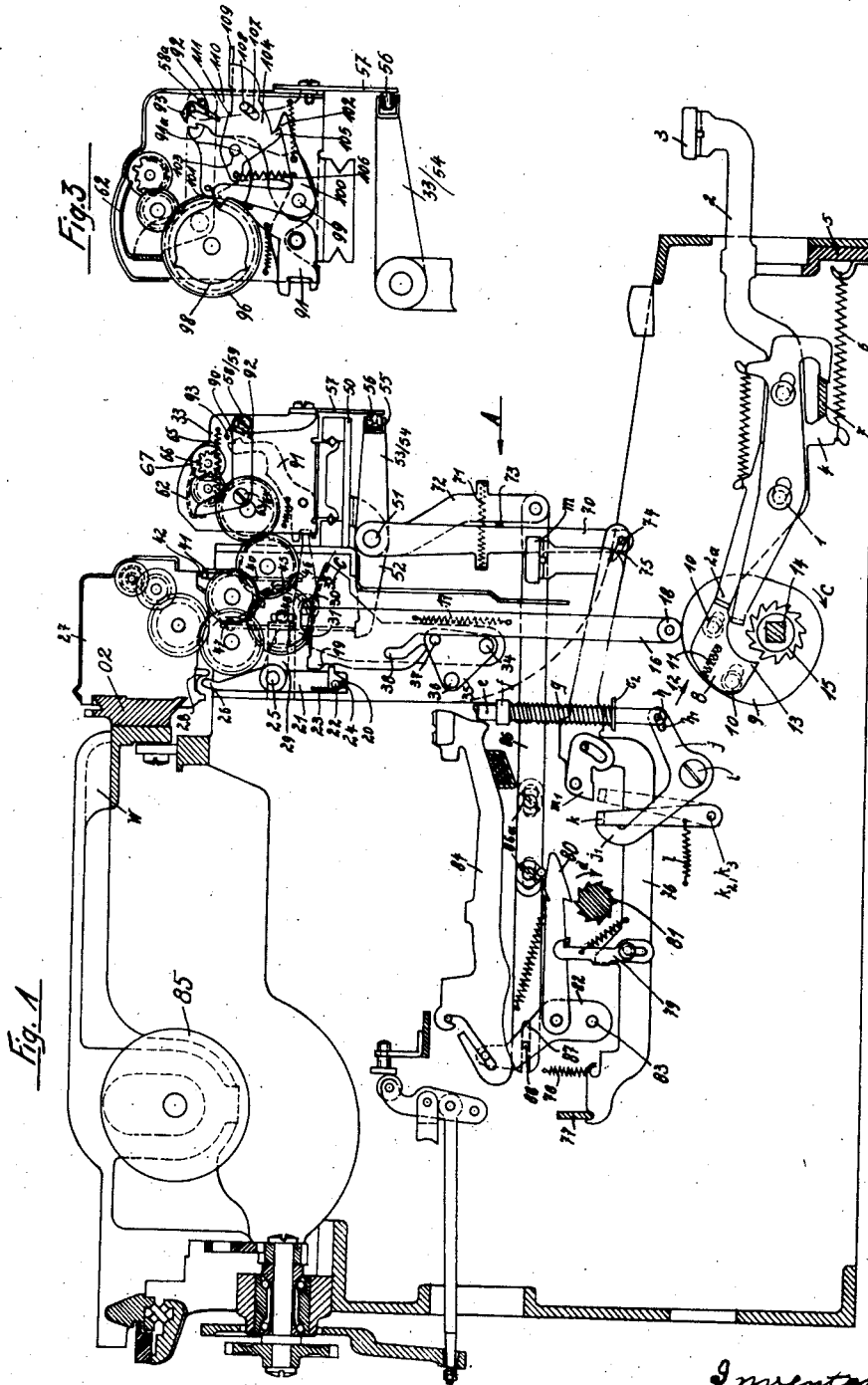
C. SCHLÜNS

2,132,192

CALCULATING MACHINE

Filed Jan. 10, 1928

3 Sheets-Sheet 1



Inventor
Carl Schlüns
By Knight & Bros
Attys

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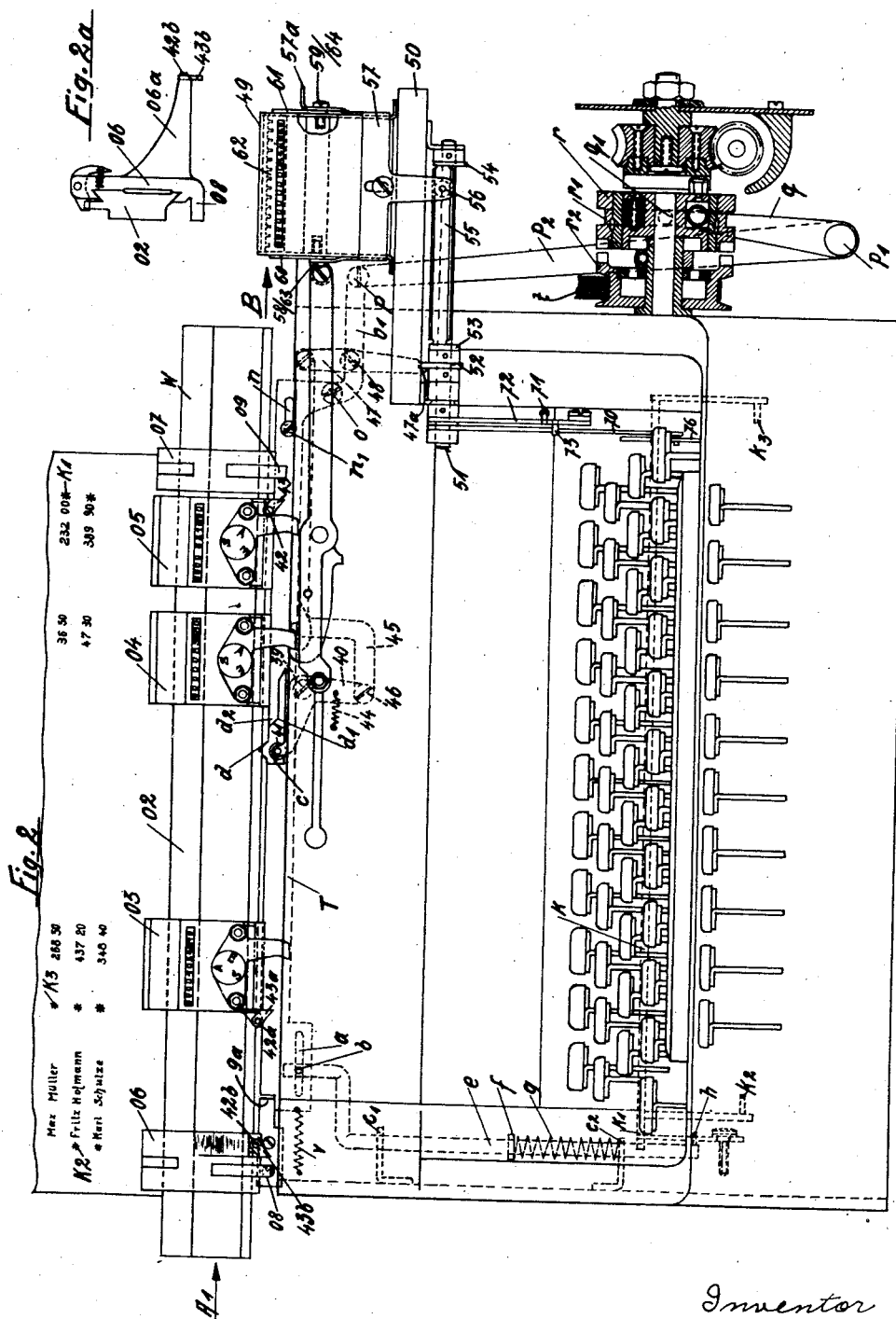
C. SCHLÜNS

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3 Sheets-Sheet 2



Inventor
Carl Schlüns
By Knight Bros
Attys

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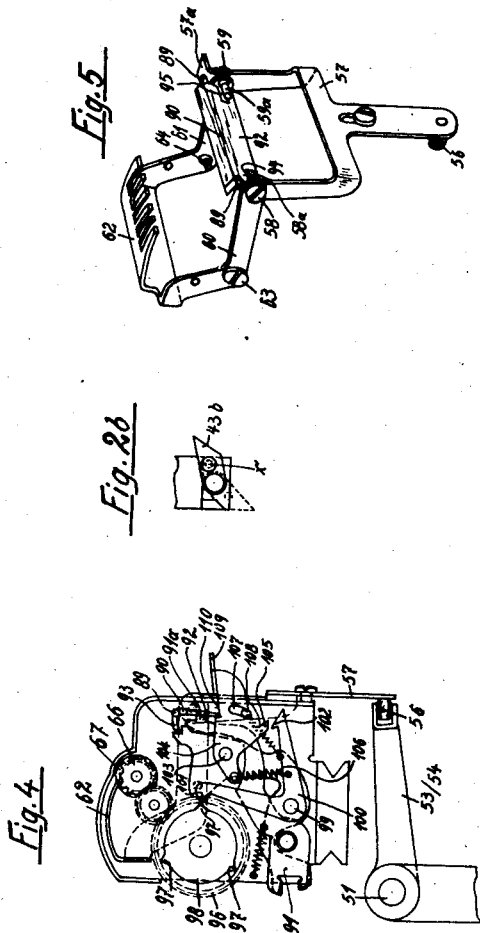
C. SCHLÜNS

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,132,192

CALCULATING MACHINE

Carl Schlüns, Steglitz, near Berlin, Germany, assignor, by mesne assignments, to Mercedes Büro - Maschinen - Werke Aktiengesellschaft, Zella-Mehlis, Germany, a joint-stock company of Germany

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In Germany January 12, 1927

24 Claims. (Cl. 235—59)

This invention refers to typewriting calculating machines and in particular to the printing mechanism for the clear sign which indicates the zero position at the transverse counting mechanism. In accordance with this invention the printing mechanism for the clear sign is automatically operated in the zero position of the calculating mechanism and in such a manner as to be dependent upon the zero position and upon the movement of the paper carriage, and in a preferred construction of the subject matter of the invention special means are provided for the operation of the printing mechanism of the clear sign. By this means it is possible to produce with absolute reliability the actuation of the device for the printing of the clear sign, inasmuch as the power may be so arranged as to be sufficiently high for this purpose. The operation of the printing mechanism is preferably effected by a power which has been accumulated in the printing operation of the clear sign. The power member is preferably connected to the printing mechanism of the clear sign by way of a feeler-member adapted to move toward the number-rollers and which is so arranged and constructed that in case one or more of the number-rollers are not in the zero-position it will prevent the action of the power member, so that an impression of the clear sign will take place only when all the number-rollers of the calculating device are in the zero position.

In the writing position of the paper carriage corresponding to the clear sign a locking instrumentality is also simultaneously moved into the operating position by the power operating the printing mechanism for the clear sign, the said locking instrumentality preventing the transferring of calculating quantities into the calculating device, so that the transferring of the values of these quantities in this position independent of the particular position of the number-rollers is prevented in this manner. This locking instrumentality is also preferably operated upon exceeding the capacity of the calculating device. The invention will be more particularly described with reference to the accompanying drawings showing by way of exemplification several forms of embodiment of the principles of the invention.

In the drawings: Fig. 1 is an elevation with parts in section showing a power-driven typewriting machine in which all parts not necessarily belonging to the invention are omitted, so as not to interfere with the clearness of illustration. Fig. 2 is a front elevation of the machine as

viewed in the direction of the arrow A of Fig. 1. Fig. 2a is a side view of the left-hand margin-setter seen in the direction of the arrow A₁ of Fig. 2. Fig. 2b is a detail to be referred to, and showing a fractional view of the margin-setter and particularly the pawl 43b on an enlarged scale in the position in which the pawl is rendered inoperative by a pin x.

Fig. 3 is an elevation showing the locking means of the transverse counting mechanism as viewed in the direction of the arrow B of Fig. 2, the left-hand side wall of the transverse counting mechanism being removed. Fig. 4 is an elevation showing the counting mechanism with the locking members in the operative position. Fig. 5 is a perspective view showing particularly the feeling members arranged on the transverse counting mechanism. Fig. 6 is a modified construction of different details of the device in perspective view and to be more particularly referred to in the specification.

The key levers 2 of the calculating machine are rockingly disposed in the frame of the machine, so as to be rotatable on the shaft 1, each of these key levers 2 being provided with a key 3. By means of a tensional spring 6 which on the one hand is operatively secured to a projection 4 of the key lever 2 and on the other hand to the machine frame at 5, the key lever 2 in its normal position is rotatably influenced in the anti-clockwise direction with relation to its shaft 1, so that it will rest with its projection 4 against the stopping member 7. Upon the depression of the key 3 the rear leg 2a of the key lever 2 will release the pawl 8 which is displaceably arranged on the cam-disc 9 by means of the rivets 10, and is continuously forced in the direction of the arrow 12 by means of the compression spring 11. In consequence thereof the pawl member 8 will move in the direction of the arrow 12 and its projecting part 13 will become engaged with the driving wheel 15 which is secured on the driving shaft 14 adapted to be continuously rotated in the direction of the arrow c. By this means the cam-disc 9 is coupled to the driving shaft 14, so as to be adapted for one rotation.

Counting slides 16 are displaceably arranged for vertical movement in the frame of the machine and are continuously forced downwards by means of tensional springs 17 which are respectively secured on each of the slides and on the machine frame, so that the slides 16 with the rollers 18 secured thereto will always rest against the respective cam-discs corresponding thereto. Upon the depression of a key 3 the corresponding

slide 16 will be lowered in consequence of the rotation of the corresponding cam 9, the downward and upward movement of the counting slides 16 causing in the well known manner all the disengagements and transferring movements required for the calculation in the counting mechanisms. The arrangement in this connection is such that upon the descent of the counting slides 16 an inclined surface 19 arranged thereon will operate the locking bar 20 which by means of its shaft 22 is rockingly disposed on two laterally disposed levers 21 (only one of which is shown in Fig. 1), the locking bar being drawn by the spring 23 against the stop 24, which position corresponds to the normal position of the parts.

The levers 21 carrying the locking bar 20 are keyed to the rotatably arranged shaft 25. When the counting slide 16 with its incline 19 acts upon the locking bar 20, the shaft 25 is rocked clockwise and in consequence thereof the unlocking lever 26 which is secured to the shaft 25 acts in the well known manner on the locking levers 28 arranged in the vertical counting mechanism 27, so that the corresponding vertical counting mechanism is unlocked. The shaft 25 carries moreover a lever 29 adapted to cooperate with the lever 31 mounted upon the shaft 30. By means of the rotation of the shaft 25 above referred to the lever 29 is accordingly rocked clockwise and will thereby and by means of the lever 31 cause the rotation of the shaft 30 and the rocking of an unlocking lever 32 secured to the shaft 30 in the anticlockwise direction. This unlocking lever 32 produces in the well known manner the unlocking of the transverse counting mechanism 33.

In bearings on both sides of the machine frame is rotatably mounted the shaft 34, upon which a plurality of levers 35 are keyed in certain definite spaced relation to each other. These levers 35 are adapted for the passage of the shafts 36 and 37 traversing the levers. The shaft 36 serves merely for the purpose of stiffening the entire system formed by the shafts 34, 36 and 37 and the levers 35, while the shaft 37 is adapted to cooperate with the several counting slides 16. Each of these counting slides 16 has a slot 38 of substantially curved shape. If after the depression of a calculating key the cam-disc 9 participates in the rotation of the driving shaft 14, so that in consequence thereof the corresponding slide 16 descends the curved slot 38 of the slide acts upon the shaft 37 and thereby rocks the frame 34, 35, 36, 37 and consequently also the shaft 34 in the anticlockwise direction to an extent corresponding to the value of the depressed key. The rocking motion corresponding to the value of such key will be regulated in the otherwise well known manner by the different inclination of the slot 38 of the several counting slides 16. In order to transfer this rocking motion to the counting mechanisms a toothed segment C is disposed upon the shaft 34, the said segment being designated with the reference character 27 in my application 632,480. Further description of the arrangement of this toothed segment and of the transferring of the value by means of the segment to the counting mechanisms is unnecessary for the understanding of the invention of this application. The action of this segment with the parts cooperating therewith has already become known from the application referred to and has only been mentioned in this connection for the better understanding of the improvement hereinafter to be described.

Before proceeding to specify the improvement according to this invention short reference will be made for the better understanding thereof to the automatic carriage regulating means described in United States Patent 1,582,788. Upon the carriage frame W (Fig. 1) the supporting bar 02 for the counting mechanism is arranged upon which the counting mechanisms 03, 04 and 05 (Fig. 2) are removably disposed in the well known manner. To the left of the first counting mechanism 03 and to the right of the last counting mechanism 05 riders or margin-setters 06 and 07 are arranged on each side of the machine, such as shown in United States Patent 1,582,788 and designated 137 and 114 respectively in that patent. On these margin-setters lugs or projections 08 and 09 respectively are provided which in the patent referred to are respectively designated 136 and 113. Upon moving the carriage W from left to right this movement will be limited by the engagement of the lug 08 against the surface *c* of the shoe *d*. This shoe *d* is secured to the key-locking bar T adapted to be displaced towards the left and in the downward direction along the frame of the machine. While the carriage is moving stepwise from right to left the lug 09 of the right hand margin-setter 07 will first move up to the corner *d*₁ of the shoe *d* without exerting any action upon it. Upon the next step of the carriage movement however the lug 09 will ascend the inclined edge *d*₂ and will thereby depress the shoe *d* and inasmuch as the shoe *d* is secured to the key locking bar T this bar will also be depressed. At its left end the bar T has a slot *a* adapted for the engagement of a pin *b* on a bar *e* which is vertically displaceable in the bearing eyes *c*₁, *c*₂. On this bar *e* a setting ring *f* is secured and between the ring and the bearing eye *c*₂ the spring *g* is disposed which in the normal position of the parts retains the key-locking bar T in the position shown in Fig. 2, that is to say, with its end blocked by the impinging edge *9a* of the frame. To the lower edge of the bar *e* and by means of the pin-and-slot connection *h*, *h*₁ (Figures 1 and 2) an elbow lever *j* is pivoted which is adapted for rocking movement on the stud *i* and the arm *j*₁ of which will retain the arm *k*₁ (Fig. 2) of a locking lever *k* in the position shown in Fig. 1 in full lines against the action of the spring *l*. The yoke-shaped lever *k* is rockingly mounted at the points *k*₂, *k*₃. In this position of the yoke *k* the writing keys *m* are freely movable as appears from Fig. 1 of the drawings. Upon the rocking of the locking or arresting yoke *k* into the position shown in dotted lines in Fig. 1 of the drawings an arresting member *m*₁ secured to a key *m* will become engaged with the arresting yoke or lever *k*, when an attempt is made to depress the key *m*, so that the depression of the particular key *m* becomes impossible.

At the right hand end the key-locking bar T is provided with a slot *n* by means of which the bar T may be guided on a screw *n*₁ secured to the frame of the machine. At its right hand end a lever *o*₁ is moreover pivotally connected to the bar T at the point *o*, the said lever being on the other hand linked at *p* to a lever *p*₂ secured to the rotatable shaft *p*₁. Upon the shaft *p*₁ a lever *q* is secured which by means of a stud *q*₁ is adapted to engage with an annular groove *r*₁ of the continuously rotated coupling section *r* of a tooth-coupling or clutch. The driven member *r*₂ is formed to constitute an operating drum from which a band *t* leads to the well known line-shifting lever not shown in the drawings and

indicated by the reference character 135 in United States Patent 1,582,788. The system of operating members hereinbefore described is acted upon by a spring *v* at the left-hand end of the key-locking bar T, shown in Fig. 2 of the drawings, in such a manner that the key-locking bar T will have the tendency to move towards the left from the position shown in Fig. 2. It is however prevented from following this tendency in the normal position of the parts by the stop 9a.

Now when the shoe *d* is depressed by the lug 69 of the right hand margin-setter 67, the left-hand extremity of the key-locking bar T and the bar *e* in pursuance thereof are likewise depressed contrary to the action of the spring *v* and in this movement the key-locking bar is released from the stop 9a. This will cause the elbow lever *j* which is connected to the bar *e* to be likewise rocked clockwise from the position shown in Fig. 1, and the locking-yoke *k* will thereby be moved to the dotted line position, and by this means all the keys *m* are locked to prevent depression thereof. Simultaneously therewith the disengagement of the key-locking bar T from the stop 9a will release the spring *v* and will cause the key-locking bar T and the driving clutch-section *r* to be displaced towards the left from the position shown in Fig. 2. In consequence thereof the drum *r*₁ is rotated and will wind up the band *t*. Inasmuch as this band is operatively connected to the line-shifting lever which in its turn is of course secured to the carriage, this action will first effect the line adjustment and then the return of the carriage, that is to say, the driving of the carriage towards the right. Near the end of this movement of the carriage to the right the left-hand margin-setter 66 with its lug 68 will become engaged with the edge *c* of the shoe *d*, by which means the key-locking bar T is displaced towards the right contrary to the action of the spring *v*. This will cause the locking-yoke *k* to re-assume the position shown in full lines in Fig. 1 and the driving coupling section *r* becomes disengaged from the driven coupling section *r*₂, and in consequence thereof the keys are released from their inoperative locked position and the carriage-pulling movement is interrupted.

I shall now proceed to describe the features constituting the main novelty of this invention.

In the frame of the machine and by means of a screw 39 (Fig. 2) an elbow lever 40 is disposed, the horizontal leg of which carries a roller 41. This roller projects into the path of a pawl 43 rockably arranged on a shaft or stud 42 at the front side of the vertical counting mechanism and directly behind the units position. A pulling spring 44 is operatively connected to the angular lever 40 and by means of the bar 45 which is pivotally connected thereto by the screw 46 the angular lever 40 is connected with the lever 47 which is rockably arranged on the stud 48 secured to the frame of the machine. The roller 41 projects likewise into the path of the pawls 43a and 43b which, the same as the pawl 43, are rockable respectively on the studs 42, 42a and 42b and on the front side of the counting mechanism 63 and 65 and on the margin-setter 66 respectively. The margin-setter 66 is provided for this purpose with a forwardly projecting arm 66a (Fig. 2a) upon which the pawl 43b is disposed.

Below the bracket 50 (Fig. 1) supporting the transverse counting mechanism 49, and in suitable bearings, a shaft 51 is rotatably mounted

upon which a lever 52 is rigidly secured adapted for cooperation with the lever 47 above referred to. The lever 47 carries a lug 47a (Fig. 2) which rests against the lever 52 and by this means will retain the system of levers 47, 45, 48 above mentioned in the position of rest corresponding to Fig. 2 of the drawings and contrary to the action of the spring 44. Upon the shaft 51 two additional levers 53 and 54 are rigidly secured (Figures 1 and 2) which at their free ends are connected by means of a U-shaped bar 55. This U-shaped bar 55 is positively connected by means of the guide-roller 56 to a slide 57 displaceably disposed at the front wall of the transverse counting mechanism and which by means of the screws 58 and 59 is linked to the legs 60 and 61 of the preferably rake-like feeling bar 62 (Figures 1 and 5). Inasmuch as the transverse counting mechanism as well as the vertical counting mechanism move temporarily with the carriage from one position to another in the known manner, and in view of the fact that the extent of the path of this temporary movement corresponds at most to the width of the transverse counting mechanism, the length of the U-shaped bar 55 should be such that the roller 56, in every position of the transverse counting mechanism, will remain in engagement with the U-shaped bar 55. The legs 60 and 61 of the feeler bar 62 are pivoted to the side walls of the transverse counting mechanism by means of the screws 63, 64 passing through the bar 62. These legs 60 and 61 are continuously pressed in the clockwise direction by a spring 65 operating thereagainst, and by this means the slide 57 is moved downwards and the shaft 51 is rotated by the intermediary of the roller 56, the U-shaped bar 55 and of the levers 53, 54, so that the lever 52 will be rocked clockwise. This rocking movement, however, is ordinarily prevented by the fact that the lever 52 rests against the lever 47, and by this means the feeling mechanism is retained in its normal position.

The rake-like feeling bar 62 cooperates with the driving wheels 66 of the number-rolls 67 (Figures 1 and 4). In these rollers that tooth which confronts the feeling bar 62 in the zero position of the number roll 67 is shortened, so as to admit of a full oscillation of the feeling bar 62. This rocking movement of the feeling bar 62 is, however, only possible, provided the bar is confronted by the shortened teeth of all the number rolls, that is to say, only in case all of the number rolls are in the zero position. In case, however, not all of the shortened teeth are opposite the feeling bar 62, the said bar 62 can only perform a partial rocking movement. The purpose of this partial rocking movement will be described and explained hereinafter.

If now the carriage W of the type-writing machine is moved from right to left, and if in this movement the pawl 43 rockably mounted by means of the stud 42 at the point of the last vertical counting mechanism (Figure 2) strikes against the roller 41, the elbow lever 40 is rocked on its pivoting stud 39 contrary to the action of the spring 44, and by this means and by the intermediary of the bar 45 the lever 47 is likewise rocked. The levers 60 and 61 are now rocked by the springs 65 on their axes 63 and 64. This action causes the slide 57 to be lowered, and by means of the U-shaped bar 55, and the levers 53, 54 the lever rotates the shaft 51.

Upon the shaft 51 a lever 70 is also rigidly secured which by means of the pulling spring 71 is

operatively connected to a lever 72 loosely and rotatably disposed on the shaft 51 the position of which with relation to the lever 70 depends on the position of the lug 73 provided on the lever 72. If the shaft 51 is rocked in the manner above described by the action of the springs 65, the levers 70 and 72 will likewise be rocked in the clockwise direction. In case during this movement the number rolls 67 of the transverse counting mechanism are all in the zero position, the lever 70 will be free to be rocked through a full amplitude, and will act with its stud 74 upon the curved slot 75 of the key-less lever 76. In consequence thereof this lever 76 is rocked clockwise on its pivoting stud 77 contrary to the action of the spring 78, and in this movement the follower-pawl 79 operatively disposed on the key-less lever 76 acts in the well known manner upon the drawing hook 80 and causes it to become engaged with the driving shaft 81 continuously rotating in the direction of the arrow *d*. By this means the intermediate lever 82 is rocked on the stud 83 in the clockwise direction, and thus the type-lever 84 carrying the "clear" sign is caused to strike the platen roller 85 in the well known manner, so that the "clear" sign "K₁" is printed.

The lever 72 in view of the operative connection of the parts 71, 73 participates in the movement of the lever 70, and by this means causes the displacement of the bar 86 in the direction of the arrow A, so that this bar 86 with its longitudinal slot 87 will rest against the stud 88 provided on the intermediate lever 82. If now the intermediate lever 82 is rocked clockwise, thereby causing the type lever 84 to strike the platen, the said lever 82 with its stud 88 acts upon the bar 86 and causes it to move in a direction opposite to the arrow A, so that the lever 72 is rocked anticlockwise. The spring 71 is selected of greater force than the springs 65, and upon the movement of the bar 86 the spring 71 carries the lever 70 along in its movement, so that the shaft 51 is rocked anticlockwise as seen from the representation of Figure 1, and the springs 65 are tensioned thereby and the key-less lever 76 is raised again.

During this procedure the carriage W makes one step towards the left in the well-known manner, which causes the pawl 43 to become disengaged from the roller 41, so that the spring 44 becomes free to act upon the lever 40, and in consequence thereof and by means of the bar 45 locks the lever 52 again, so that all the parts will re-assume their normal positions, shown in Figures 1 and 2 of the drawings. The spring 71 will then serve for the absorption of the very high degree of energy imparted by the intermediate lever 82 to the bar 86, and thereby obviates injury to the parts. The operative length of the bar 86 is moreover adjustable by the screw-and-slot connection 86a, so as to permit regulation and adjustment of the operation of the spring 71. During the stepwise movement of the carriage above referred to the lug 09 of the right-hand margin-setter 07 has also moved upwards upon the inclined edge *d*₂ of the shoe *d*, and has thereby caused the carriage-returning means, the line-shifting means and the key-locking means to be operated in the manner hereinbefore particularly described. Thus, if the "clear" sign K₁ is printed, the step-movement of the carriage, which results therefrom, causes the carriage-returning means to be operated and the carriage is automatically moved back towards the right. In the beginning of the carriage-returning movement

the pawl 43 becomes again engaged with the roller 41, but this time without operating the roller, because the pawl 43 is free to be rocked clockwise contrary to the action of a spring not shown, while, when the carriage is moved towards the left, the pawl will bear against the right-hand side wall of the counting mechanism and becomes operative. In the same manner the pawl 43a of the first counting mechanism 03 passes inoperatively clear of the roller 41, inasmuch as it is arranged in the same manner as the pawl 43. Towards the end of the carriage-returning movement however the pawl 43b which is oppositely arranged with relation to the pawls 43 and 43a, and which is arranged on the margin-setter 06 becomes engaged with the roller 41, depressing it, so that in the manner above described a printing instrumentability for the printing of the "clear" sign is again made to operate and the "clear" sign is printed, as shown at K₂, at the commencement of the next line. Immediately thereafter however the lug 08 of the left-hand margin-setter 06 strikes against the edge *c* of the shoe *d*, and in consequence thereof the carriage-returning movement is arrested in the manner above described. It follows from what has been heretofore stated that during the stepwise movement of the carriage towards the left the pawl 43a of the counting mechanism 03 will cause the printing of a "clear" sign K₃ in the same manner as shown to occur by means of the pawl 43 of the counting mechanism 05. Should the "clear" sign K₂ be not desired, it is only necessary to replace the rider 06 by an ordinary margin-setter unprovided with the arm 06a and the pawl 43b. In this case merely the "clear" signs K₃ and K₁ will be printed. If however the printing of the clear signs K₂ and K₁ is desired, only the counting mechanism 03 carrying the pawl 43a has to be exchanged by an ordinary counting mechanism. The operator is therefore at liberty to cause the "clear" signs to be automatically printed by the machine at any desired place. It is obvious moreover that the pawl 43 may also be disposed on the rider 07 instead of being arranged on the counting mechanism 05, the rider in this case being provided with an arm 06a in the same manner as the rider 06. Besides, each of the pawls, 43, 43a, 43b may be rendered inoperative by moving it into the position shown in Figure 2b (with respect to the pawl 43b) against the action of its spring, in which position the pawl is retained by a pin *x* which is inserted in a corresponding hole of the pawl and of the rider.

In order to prevent quantities from being carried and transferred into the counting mechanism during the automatic recording of a "clear" sign, the following arrangement is provided:—

In the counting mechanism a locking flap 90 rockable on the shaft or stud 89 is provided which ordinarily, by means of a spring not shown in the drawings, assumes the position according to Figures 1, 3 and 5. This locking flap 90, as is well known, at each transmission of a value or quantity into the counting mechanism, is moved by the end 91a of the particular unlocking lever 91 into the position shown in Figure 4 of the drawings, the said lever 91 acting against the downwardly projecting leg 92 of the locking flap 90, while the horizontal leg 93 of the flap places itself against the unlocking levers which are in the position of rest, as appears from Figure 4 of the drawings. The parts 90, 91 and 93 are of well known construction. They are designated in U. S. Patent 1,270,471 in Fig. 14 by the numbers 246, 248 and 75

238 and their action is fully described in that patent on page 8 under the heading "The totalizers". Now, the arrangement is such that the screws 58, 59 which constitute the pivoting shafts for the connection of the levers 60, 61 with the slide 57 are provided with studs 58a, 59a which extend into the counting mechanism through slots in the side walls of the counting mechanism. The locking flap 90 is provided with corresponding recesses 94, 95 confronting the studs 58a, 59a. In the normal position of the slide 57 and of the feeler bar 62, and in case the locking flap 90 is rocked upon the carrying of a quantity-value into the counting mechanism, the studs 58a and 59a enter the slots 94 and 95, so that the flap 90 may be freely oscillated. If however, the feeling instrumentality is in the operating position in which the slide 57 and by its movement the pivoting studs 58a and 59a are moved downwardly, the studs become removed from the path of the slots 94 and 95, so that the locking flap 90 is prevented from oscillating. In consequence thereof the particular locking lever 91 is secured against oscillation and accordingly also the unlocking lever 32, and the levers 31, 29 and 21. The locking bar 20 is thereby likewise prevented from oscillation, so that the counting slide 16, in spite of the striking of a calculating key and in spite of the resulting rotation of the corresponding cam disc 9 cannot move downwards, inasmuch as its edge 19 rests against the locking bar 20. The transmission quantities during the automatic printing of the "clear" sign is therefore rendered impossible.

Furthermore, the transfer of quantities should also be prevented, in case the transverse counting mechanism has not been set to zero in consequence of a mistake in the writing up of the quantity or value. In this case any normal tooth of a number roll 67 upon the release of the lever 52 by the lever 47 will prevent complete rocking of the feeling bar 62, so that this bar will only perform a partial oscillation. In view of the fact that then the lever 70 will also be partially rocked, the slot 75 provided in the key-less lever 76 is of such shape that this rocking movement of the lever 70 does not influence the key-less lever 76. In view thereof the printing of the "clear" sign will not occur in all those cases in which the transverse counting mechanism is not in the zero position; and in case the "clear" sign K₁ is to be printed, the stepwise movement of the carriage following the sign and the return of the carriage consequent thereupon are likewise prevented, and by this means the operator is warned that he has not properly emptied the transverse counting mechanism. The partial outward rocking of the feeling bar 62 is however sufficient to cause the disengagement of the studs 58a, 59a from the path of the slots 94, 95, so that there is no possibility of a rocking movement of the locking flap 90 and of the locking lever 91, inasmuch as the locking flap 90 places itself against the studs 58a and 59a. Upon the striking of any calculating key the cam-disc 9 will therefore be given one rotation, but the corresponding counting slide 16 will be locked by the bar 20 in the manner above described. In order to unlock these arresting means the slide 57 is provided with an outwardly bent projection 57a. By raising this projection the studs 58a and 59a are returned to the path of the slots 94, 95, while the lever 47 again places itself over the lever 52, so that the locking flap 90 becomes again freely rockable.

The form of execution shown in Figure 6 of the drawings is distinguished from the exemplification

just described by the fact that the locking flap 90 employed for the prevention of the movement of the counting slides is dispensed with, so that the studs 58a and 59a, as well as the slots 94 and 95 are no longer required. Those parts of the modification according to Figure 6 which correspond to the ones already mentioned are designated in the following description with the same reference letter followed by the index "x".

In accordance with the modification of Figure 6 the unlocking lever 32x constitutes an elbow-lever. Upon the lever 52x being released by the lever 47x the projection 52b provided on the lever 52x is moved into the path of movement of the vertical arm 32b of the lever 32x, by which means the rocking of the lever is prevented, and consequently, as above described, the downward movement of the counting slide cannot take place. The locking device of the counting slides 16 may be of different construction, the arrangement being such that said locking device is adapted to arrest the movement of any part which prevents the operation of the counting slides 16 or of the value-registering elements upon the actuation of the value-keys.

Means are also provided to effect the locking of the counting mechanism in case the capacity thereof has been exceeded. With this end in view a disc 98 with three projections or cams 97 is provided adjacent the driving wheel 96 farthest to the left, which has 30 teeth (Figures 3 and 4). The said projections are uniformly distributed on the periphery in such a manner that they will become operative whenever the number roll 67 which happens to be furthest to the left is changing from "9" to "0", or from "0" to "9". In the position shown in Figure 3 the projections 97 are shown in the inoperative position. These projections or cams cooperate with a lever 100 rockably disposed on a shaft or stud 99 the terminal lug 101 of which acts as a feeler by moving along the said cam disc 98, while the projection 102 of the lever 100 cooperates with a projection or lug 105 provided on a lever 104 which is pivoted on a stud 103. Both levers 100 and 104 are acted upon by the common pulling spring 106 in the anti-clockwise direction. The lever 104 is provided with an elongated hole 107 in which the stud 108 is engaged, so as to restrict the movement of the lever 104. Moreover a handle 109 or the like is provided on the lever 104 which projects from the counting mechanism towards the front side.

Upon going beyond the value "0" toward "9" or from "9" to "0" on the number roll the particular cam 97 in consequence of the engagement of the cam or projection with the lug 101 will rock the lever 100 on the stud 99 contrary to the action of the spring 106, while the projection 102 becomes disengaged from the projection 105 of the lever 104. This lever 104 will now perform a rocking movement on the axis 103 and assumes the position shown in Figure 4, in which position the shoulder or projection 111 which is formed by the notch or recess 110 places itself against the locking flap 90 which has been rocked by the particular operating lever 91, 91a, the locking flap 90 being thereby prevented from returning so that it cannot release the remaining unlocking levers 91. It has now become impossible to introduce or transfer into, or to withdraw another quantity-value from the counting mechanism. If it is desired to disengage the locking device, it is only necessary to manually move back the lever into its position of rest shown in Figure 3 by operating the handle 109.

This arrangement may, of course, be provided both on the transverse counting mechanism of the calculating typewriting machine, as well as on each vertical counting mechanism. It may moreover be employed in connection with stationary counting mechanisms.

The invention is, of course, susceptible of other modifications and changes in various particulars without departing from the spirit and scope of the invention, except as otherwise stated in the accompanying claims.

I claim:—

1. In a machine of the class described, a counting mechanism, a traveling paper carriage, a "clear" sign printing mechanism, automatic operating means for said printing mechanism, means controlled by said paper carriage in its travel for starting said operating means, and means controlled by said counting mechanism for arresting said operating means when said counting mechanism is not in a certain condition.

2. In a machine of the class described, a counting mechanism, a traveling paper carriage, a "clear" sign printing mechanism, automatic operating means for said printing mechanism, means controlled by said paper carriage in its travel for starting said operating means, and a feeler controlled by said counting mechanism and adapted to arrest said operating means when the counting wheels of said counting mechanism are not in zero position.

3. In a machine of the class described, a counting mechanism, a traveling paper carriage, a "clear" sign printing mechanism, automatic operating means for said printing mechanism, means including an adjustable lug on said paper carriage for starting said operating means, and means controlled by said counting mechanism for arresting said operating means when said counting mechanism is not in a certain condition.

4. In a machine of the class described, a counting mechanism, a traveling paper carriage, a "clear" sign printing mechanism, automatic operating means for said printing mechanism, means for starting said operating means including a lug on said paper carriage adjustable longitudinally thereof and also adjustable to an inoperative position, and means controlled by said counting mechanism for arresting said operating means when said counting mechanism is not in a certain condition.

5. In a machine of the class described, a counting mechanism, a paper carriage, line shifting and carriage returning means, printing mechanism including a set of keys and a "clear" sign printing mechanism, key locking means, automatic operating means for said "clear" sign printing mechanism, means controlled by said carriage for starting said operating means, and means whereby the operation of said "clear" sign printing mechanism controls said line shifting and carriage returning means and said key locking means.

6. In a machine of the class described, a counting mechanism, a paper carriage, line shifting and carriage returning means, printing mechanism including a set of keys and a "clear" sign printing mechanism, key locking means, automatic operating means for said "clear" sign printing mechanism, and a rider on said carriage adapted to engage said operating means to start a "clear" sign printing operation, and means whereby the operation of said "clear" sign printing mechanism controls the operation of said line shifting and carriage returning means and said

key locking means simultaneously in dependence upon the movement of said carriage.

7. In a machine of the class described, a counting mechanism, a traveling paper carriage, carriage returning and line shifting means, a "clear" sign printing mechanism, automatic operating means for said printing mechanism, means rendering the operation of said printing mechanism dependent upon the condition of said counting mechanism, and means whereby said operating means is automatically started upon completion of the line shift and return movement of said carriage.

8. In a machine of the class described, a counting mechanism, a traveling paper carriage, a "clear" sign printing mechanism, normally tensioned and locked automatic operating means for said printing mechanism, means controlled by movement of said carriage for releasing said operating means, and means whereby said operating means is reset by said printing mechanism.

9. The combination with a machine as described in claim 8 of a feeler coordinated with said counting mechanism and connected to said operating means so as to restrain the same from operation unless the numeral indicators of said counting mechanism are all at zero.

10. In a machine of the class described, a counting mechanism, counting slides for introducing values into said counting mechanism, a paper carriage, a "clear" sign printing mechanism, a power drive, means for coupling said "clear" sign printing mechanism to said power drive for operation thereby, means for engaging said coupling means, a feeler coordinated with said counting mechanism and connected to said engaging means so as to restrain the same from operative movement unless the numeral indicators of said counting mechanism are all at zero, and a normally ineffective locking device for said counting slides connected with said engaging means and adapted to be moved to operative position thereby.

11. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, a member having a progressive movement during the normal operation of the machine, means adapted to be actuated by said member for starting said operating means, feeler mechanism cooperating with said counting mechanism and adapted to restrain said operating means when the counting mechanism is not at zero, and normally ineffective locking means for said value introducing means adapted to be rendered effective by said operating means when the latter is released.

12. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, means for releasing said operating means at a definite stage in the normal operation of the machine, feeler means controlled by said counting mechanism to arrest said operating means before its motion to operate said printing means is completed when said counting mechanism is not in zero condition, and normally ineffective locking means for said value introducing means adapted to be rendered effective by the movement of said operating means prior to its arrest by said feeler means.

13. In a machine of the class described, a

counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally tensioned and latched operating means for said printing mechanism, means for releasing said operating means at a definite stage in the normal operation of the machine, feeler means controlled by said counting mechanism to arrest said operating means before its motion to operate said printing means is completed when said counting mechanism is not in zero condition, and normally ineffective locking means for said value introducing means adapted to be rendered effective by the movement of said operating means prior to its arrest by said feeler means.

14. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally tensioned and latched operating means for said printing mechanism, means for releasing said operating means at a definite stage in the normal operation of the machine, feeler means controlled by said counting mechanism to arrest said operating means before its motion to operate said printing means is completed when said counting mechanism is not in zero condition, normally ineffective locking means for said value introducing means adapted to be rendered effective by the movement of said operating means prior to its arrest by said feeler means, means whereby said operating means and said locking means are restored by said printing mechanism during an operative movement of the same, said operating means and locking means remaining unrestored when said operating means are restrained by said feeler means.

15. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, a member having a progressive movement during the normal operation of the machine, means adapted to be actuated by said member for starting said operating means, feeler mechanism cooperating with said counting mechanism and adapted to restrain said operating means when the counting mechanism is not at zero, and normally ineffective locking means for said value introducing means adapted to be rendered effective by said operating means when the latter is released, one part of said locking means being mounted on said feeler means.

16. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, a member having a progressive movement during the normal operation of the machine, means adapted to be actuated by said member for starting said operating means, feeler mechanism cooperating with said counting mechanism and adapted to restrain said operating means when the counting mechanism is not at zero, and normally ineffective locking means for said value introducing means adapted to be rendered effective by said operating means when the latter is released, one part of said locking means being mounted on said feeler means, said feeler means having a sufficient motion even when said counting mechanism is not in zero condition to move said part of said locking means to operative position.

17. In a machine of the class described, a

counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, a member having a progressive movement during the normal operation of the machine, means adapted to be actuated by said member for starting said operating means, feeler mechanism cooperating with said counting mechanism and adapted to restrain said operating means when the counting mechanism is not at zero, and normally ineffective locking means for said value introducing means adapted to be rendered effective by said operating means when the latter is released, said locking means comprising one or more pins on said feeler adapted to be moved into the path of a part of said counting mechanism which is moved in the normal operation of the latter.

18. In a machine of the class described, a counting mechanism, means for introducing values into said counting mechanism, a "clear" sign printing mechanism, normally prepared power driven operating means therefor, a member having a progressive movement during the normal operation of the machine, means adapted to be actuated by said member for starting said operating means, feeler mechanism cooperating with said counting mechanism and adapted to restrain said operating means when the counting mechanism is not at zero, and normally ineffective locking means for said value introducing means adapted to be rendered effective by said operating means when the latter is released, said printing mechanism and said operating means being coupled by a lost motion connection which permits movement of said locking means to operative position without operating said printing mechanism.

19. In a machine of the class described, a bodily movable counting mechanism, a "clear" sign printing mechanism, operating means therefor, an energy storing device mounted on said counting mechanism, and connections whereby energy from said energy storing device is transmitted to said operating means to move the same, said connections comprising a sliding coupling permitting said counting mechanism to move without disabling said connections.

20. In a machine of the class described, a counting mechanism, a "clear" sign printing mechanism, operating means therefor, an energy storing device, connections whereby energy from said energy storing device is transmitted to said operating means to move the same, and means for restoring energy to said energy storing device from said printing mechanism during the operation of the latter.

21. In a machine of the class described, a counting mechanism; a paper carriage; a "clear" sign printing mechanism comprising a power driven shaft, a type bar, normally disconnected coupling means between said type bar and shaft, and an operating lever adapted to connect said coupling means to said shaft; operating means connected to said operating lever and including energy storing driving means influencing said operating means toward position to actuate said operating lever, holding means for said operating means, means for automatically releasing said holding means at a certain stage in the operation of the machine, and connections between said coupling and operating means whereby an operative motion of the former returns the latter to position of rest and restores the energy of said driving means.

22. In a machine of the class described, a counting mechanism; a paper carriage; a "clear" sign printing mechanism comprising a power driven shaft, a type bar, normally disconnected
5 coupling means between said type bar and shaft, and an operating lever adapted to connect said coupling means to said shaft; operating means connected to said operating lever and including energy storing driving means influencing said
10 operating means toward position to actuate said operating lever, holding means for said operating means, means for automatically releasing said holding means at a certain stage in the operation of the machine, and connections between said
15 coupling and operating means whereby an operative motion of the former returns the latter to position of rest and restores the energy of said driving means, said last mentioned connections including a shock absorbing spring.

23. In a machine of the class described, a
20 counting mechanism, a member having a continued forward movement during the successive steps of the normal operation of said machine, printing members including a "clear" sign print-

ing mechanism, automatic operating means for said printing mechanism, means actuated by said first-named member during its forward movement to start said operating means, and control mechanism for making the actuation of
5 said "clear" sign printing means dependent upon the numeral indicators of said counting mechanism being in zero position.

24. In a typewriting calculating machine, a counting mechanism comprising a set of counting
10 elements for a plurality of orders, mechanism for printing numerals and shifting said counting elements accordingly one order at a time, means for printing a distinctive sign, a member having a continued forward movement during the suc-
15 cessive steps of normal operation of the machine, automatic operating means for said distinctive sign printing means, and means actuated by said member during its forward movement to start said automatic operating means, and a
20 supplementary control for said actuating means to render the same dependent upon the condition of said counting mechanism.

CARL SCHLÜNS.