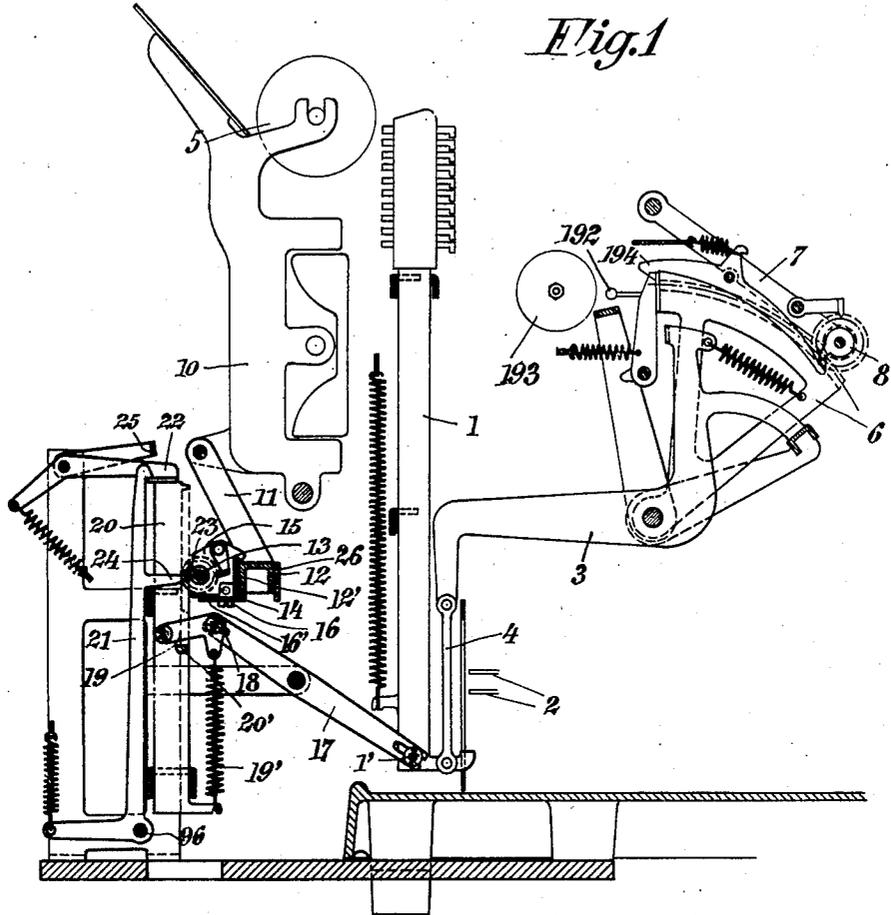


Jan. 3, 1933.

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PRINTING OR TYPING ADDING OR SUBTRACTING  
MACHINE OR TYPING CALCULATING MACHINE  
Filed Feb. 5, 1929

1,893,081

8 Sheets-Sheet 1



S. J. Herzstark  
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By: *Mark & Clark*  
ATTYS.

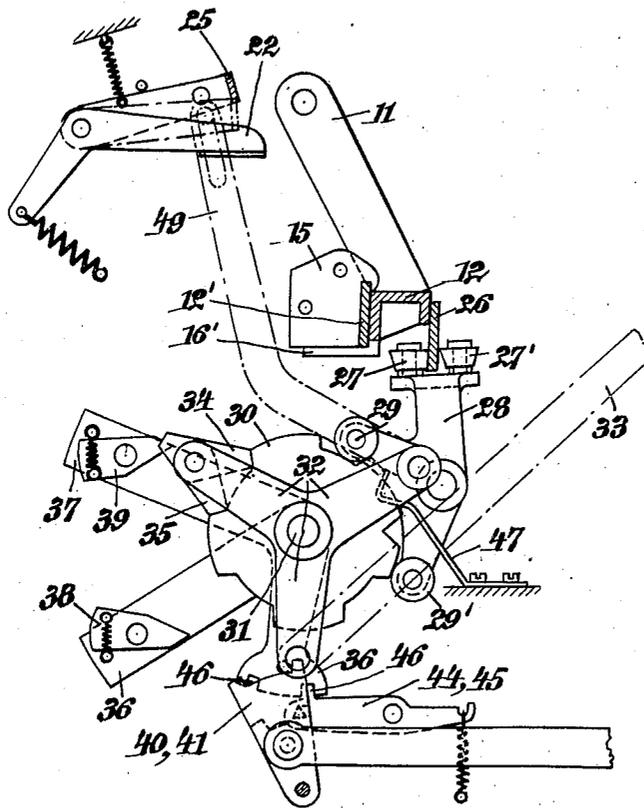
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Fig. 2



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8 Sheets-Sheet 3

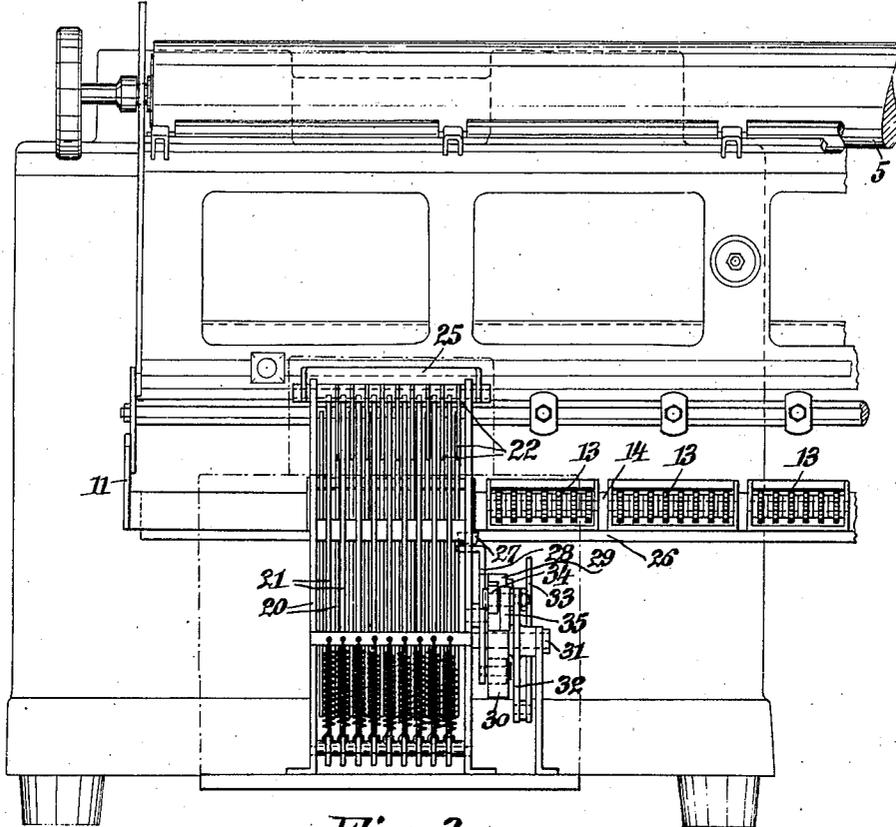


Fig. 3

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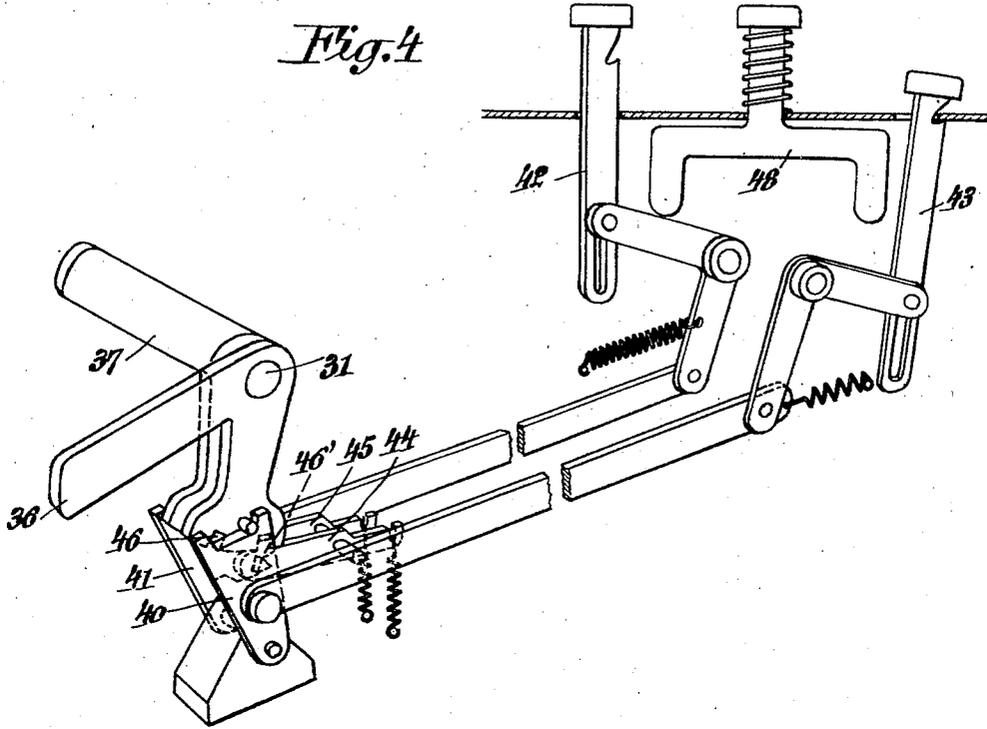
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*Fig. 4*



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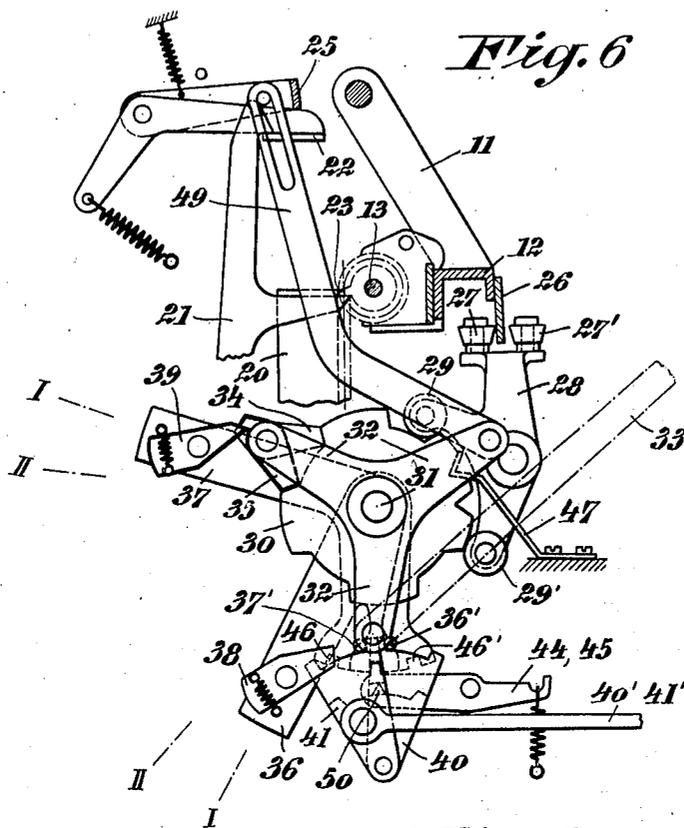
By: *Marks & Clark*  
Attys.

Jan. 3, 1933.

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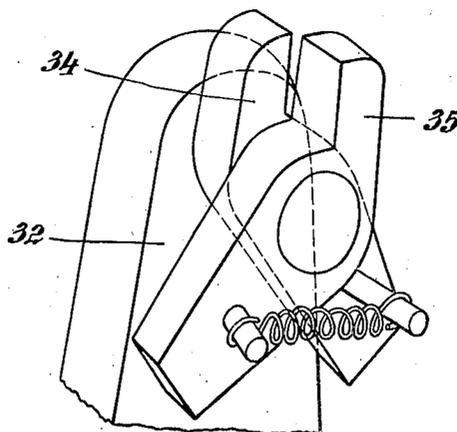
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*Fig. 6*

*Fig. 5*



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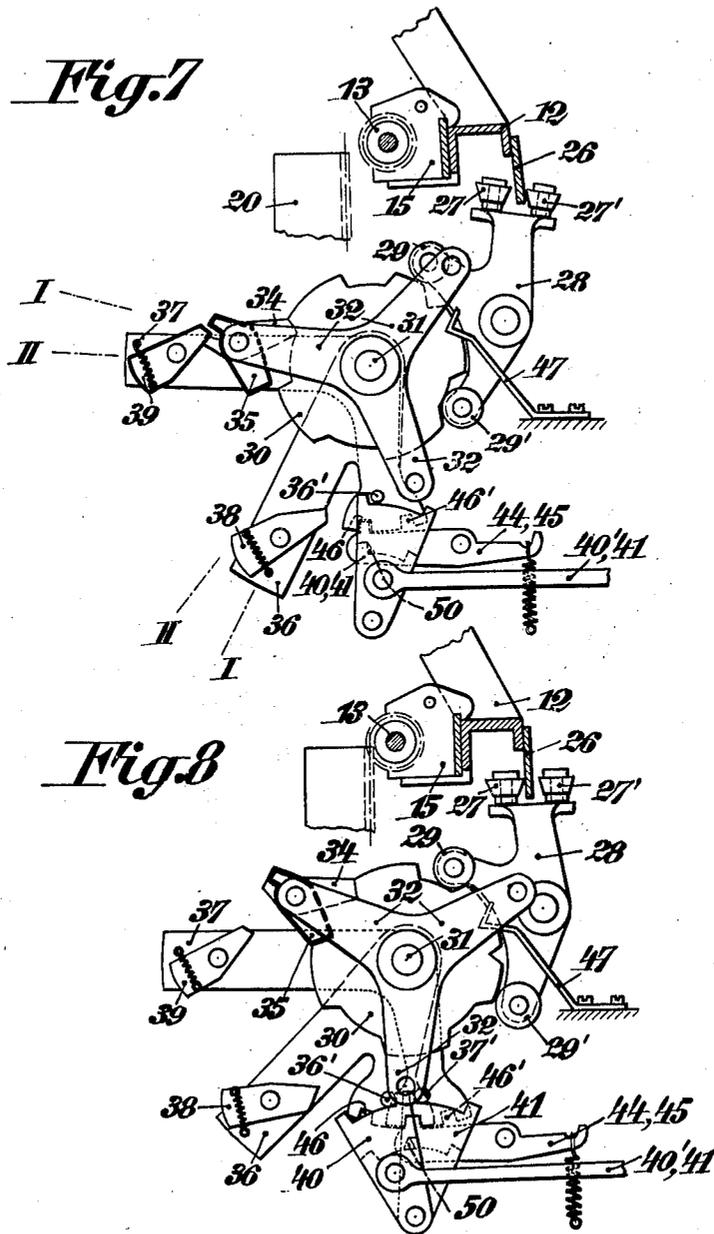
By: *Marks & Fleiss*  
ATTYS.

Jan. 3, 1933.

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1,893,081

8 Sheets-Sheet 6



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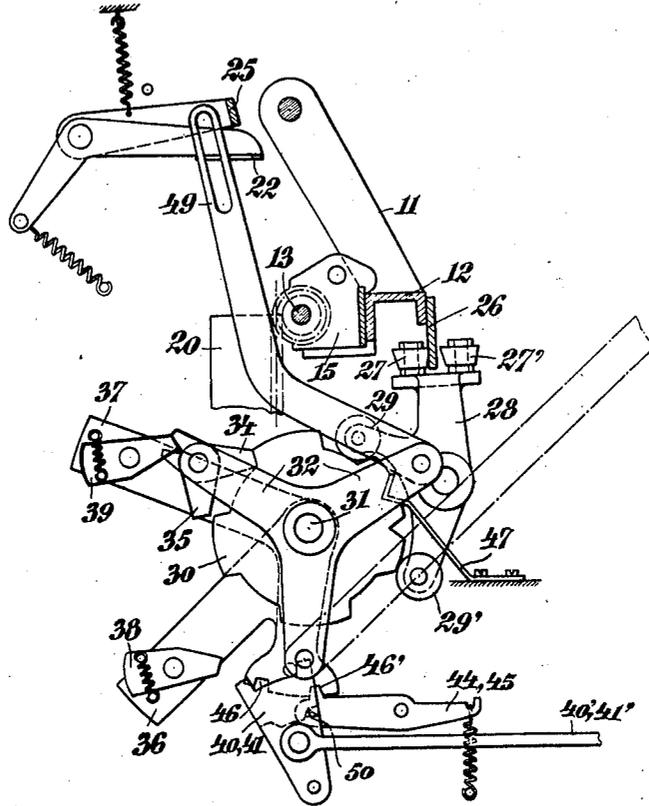
Jan. 3, 1933.

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8 Sheets-Sheet 7

*Fig. 9*



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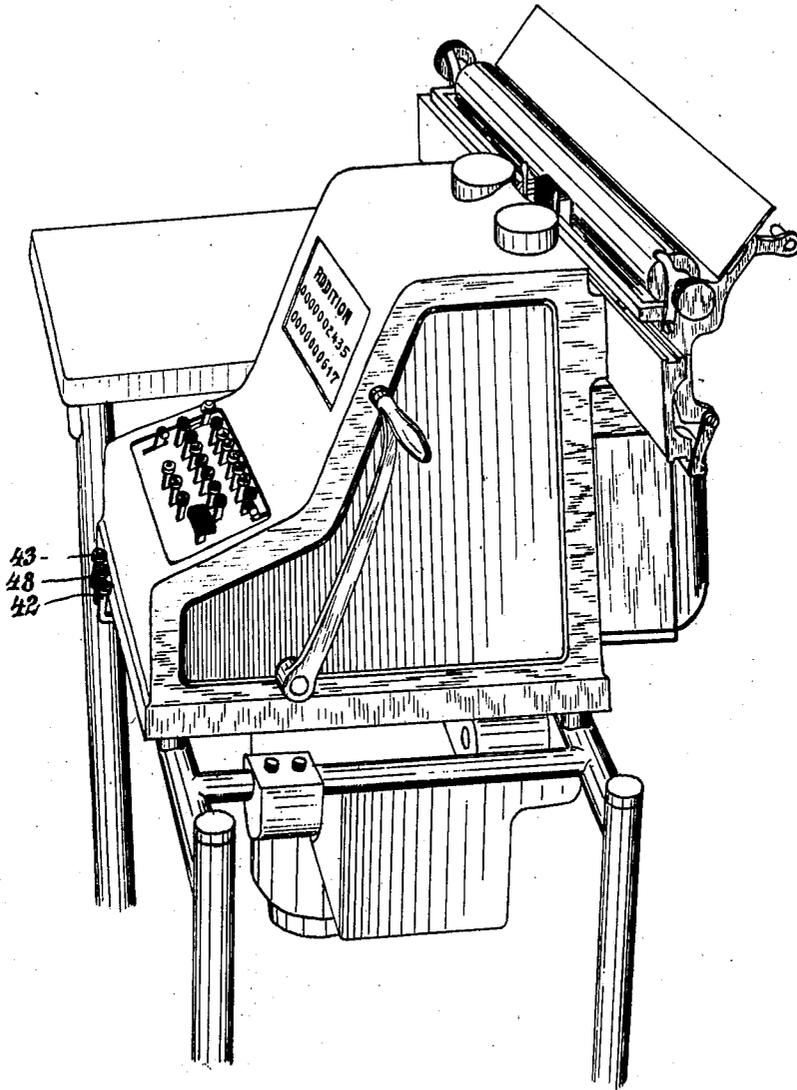
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8 Sheets-Sheet 8

*Fig. 10.*



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# UNITED STATES PATENT OFFICE

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PRINTING OR TYPING ADDING OR SUBTRACTING MACHINE OR TYPING CALCULATING MACHINE

Application filed February 5, 1929, Serial No. 337,685, and in Austria February 7, 1928.

This invention relates to improvements in typing calculating machines with printing mechanism, a transversely moving paper carriage and a number of counters which are  
5 movable in accordance with or independently from the paper carriage.

The essential feature of the present invention consists in this that the movable counters as well as the actuating mechanism therefore  
10 form a unit which is quite separate from the machine but can be fitted to any existing calculating machine. All that is necessary is to couple or connect the actuating mechanism of the unit with the actuating mechanism of the  
15 said calculating machine with printing mechanism.

The counters which may be of various sizes (capacity) are arranged preferably readily removable at desired distances apart on the  
20 paper-carriage.

One mode of carrying out the present invention is illustrated by way of example on the accompanying sheets of drawings in which:—

25 Fig. 1 is a side view of the arrangement.

Fig. 2 illustrates a similar view of different parts of the machine.

Fig. 3 is a rear view of the paper carriage with the counters, and

30 Fig. 4 is a perspective view of a portion of the mechanism shown in Fig. 2 to an enlarged scale.

Fig. 5 is a perspective view of a detail and Figs. 6, 7, 8 and 9 illustrate the control  
35 mechanism in four different positions.

Fig. 10 is a perspective general view of the machine according to the present invention.

The parts in Fig. 1 illustrated by the thin lines show the known construction of the  
40 typing calculating machine, which essentially is provided with type-holders or bars 1 (covering each other in the drawings), the stroke or movement of the same being limited in known manner by adjustable mem-  
45 bers 2, which are operated by keys (not illustrated). When lifting the type-holders or bars by means of the double armed lever 3, operated by a hand-crank, and the pivoted connecting rod 4, the raised position of the  
50 former depends on the operative position

taken up by the adjustable members 2 according to the number set at the time. The types of the individual type-holders or bars are disposed in a line, so that the set number can be printed on the paper, passing over  
55 the platen-roller 5.

Before the return movement of the type-holders or bars the toothed segments 6, which are connected with the levers 3, are placed in mesh with the wheels of the counter 8 by  
60 rocking the arms 7 in known manner, so that each counter-wheel takes up the return movement of the corresponding type-holder.

The further arrangement according to the present invention is illustrated in thick lines  
65 in Fig. 1.

A U-shaped bar 12 is pivotally secured by means of arms 11 to the side faces of a slide 10, which carries the paper-roller 5. The column-counters 13 are arranged longitudi-  
70 nally movable on the said bar (Figs. 1 and 3). Clamping members 16<sup>1</sup> are secured to the lateral parts 15 of the casings of the counters 13 by means of screws 16 and together  
75 with the lateral parts 15 embrace the flange 12<sup>1</sup> of the bar 12. The casings with the counters can be shifted when the screws 16 are loosened, while the same are fixed by tightening the latter. The object thereof is to permit the suitable adjustment or setting  
80 of the individual counters for the column-arrangement. The individual counters 13 are successively operated by the type-holders or bars 1 by the feed of the slide 10, the number of counters 13 mounted on the bar 12 cor-  
85 responding to the number of columns to which the machine is adapted. For this object each type-bar 1 is provided with a pin 1<sup>1</sup>, each of which engages the forked end of a lever 17, the other forked end of the latter  
90 engaging a pin 18 of a springy rocking member 19, which engages a longitudinally movable rack 20. The movement of the rocking member 19 brings it into engagement with a stop 20<sup>1</sup>, mounted on the rack, so that the  
95 latter is shifted after the rocking member engages the stop. The principal object of the idle motion of the member 19 is to move the type-bar 1 into the printing position of the figure nought by depressing the nought-  
100

key, without influencing the rack 20 and thus subsequently the corresponding wheel of the counter 13. The idle movement of the lever 19 also serves for rendering possible the tens-transmission.

Further during this idle movement various other adjusting movements are carried out in the machine as will be described at a later stage. The lever 19 comes against the stop 20<sup>1</sup> just at the moment when the nought-type is disposed in the printing position. From this moment the rack 20 is moved downward, while the lever 19 is continuously pressed onto the stop 20<sup>1</sup> by the spring 19<sup>1</sup>.

The printing operation and at the same time the return movement of all tens-transmission arresting pawls 22 by the return-rail 25, as will be described later on, is carried out whenever the type-bars 1 have taken up their highest position corresponding to the set amounts.

The return movement of the lever 3 and thus of the toothed segments 6 and of the type-bars 1 commences after the engagement of the counters 8 and 13. The toothed segment 6 rotates the figure-disks of the counter 8 to an extent, corresponding to the number of teeth through which the segment has moved. The tens-transmission is constructed in the following manner, in order to dispense with the arrangement of a separate tens-transmission for each column-counter:—

Each rack 20 is provided with a spring-loaded hooked lever 21, which holds down a spring-loaded flap-lever 22 for limiting the movement of the adjacent rack of the next higher place-value. Usually the hooked lever 21 retains the flap-lever 22, so that the rack can return into its initial position and thereby rotate the counter-wheel to an extent corresponding to the number set in the machine. Each counter-wheel is provided with a tens-tooth 23, which during the movement past arm 24 of the hooked lever 21 turns the latter, whereby the lever 22, limiting the stroke of the next rack is released and swings outward until it reaches the spring-loaded return rail 25. Thereby it is rendered possible, that this rack, which corresponds to the next higher place-value, passes beyond its initial position a distance corresponding to one pitch of the teeth and thus adds a unit in the counter wheel of the next higher place-value, if the wheel of the next lower place-value passes from "nine" to "nought".

The column-counters have to be engaged with or disengaged from the racks 20 in a certain order, according to the desired operation of the machine, for example, entering an item in the counter, indication of an intermediate sum or subtotal in the counter 8, and printing of the total. During the usual calculation, e. g. the registration and printing of the amounts with subsequent advance

of the carriage, the counters 13 have to be engaged only at the same time as the counter 8. The engagement and disengagement of the counters is substantially carried out during the idle stroke of the type-bars 1 from the basic position to the zero-position. However if it is desired to take a total from the column-counters, it is necessary that the corresponding counter 13 shall be in the engaged position during the upward stroke of the type-bars 1 and disengaged during the return movement. The sum is printed or indicated in the counter 8 by turning back the wheels of the counter 13 to such an extent by means of lifting the type-bars, until the tens-transmission teeth 23 strike against the arms 24 from the opposite direction and, because the teeth do not find inclined faces at this side, each counter-wheel is arrested in the zero-position, whereby the lift of the type-bars 1 is limited. The latter are now disposed in the position, which corresponds to the values standing in the counter 13. The column-counter is now in the zero condition and ready for a new registration.

Therefore the counters 13 have to be engaged in three different ways, namely either only during the return movement of the type-bars or only during their lift and finally for a sub-total during the lift and return movement of the same. The arrangement shown in Fig. 2 is suited for carrying out the said three different operations. The U-shaped bar 12, already shown in Fig. 1 and pivotally secured to the slide of the paper-roller by means of the levers 11 and carrying the casings 15 of the column-counters on the bar 12, is provided with a lateral bar 26 which is engaged by rollers 27 and 27<sup>1</sup>. The latter are mounted on one arm of a lever 28 furnished with three arms, each of the two other arms carrying a roller 29, 29<sup>1</sup>, which engage recesses of a control-disk 30, so that the lever 28 is turned according to the position of the control-disk and thereby the bar 12 is displaced and consequently the counters 13 (Fig. 1) arranged on the same are moved into or out of engagement with the racks 20 (Fig. 1). The control-disk is rotatably mounted on a pin 31 secured to the frame, and is operated as follows. A lever 32, provided with three arms, is mounted on the pin 31 and one arm of the former is connected by a connecting rod 33 with the hand operated crank or other driving means for operating the machine, so that the said arm moves to and fro through an arc of ninety degrees when operating the said crank. The second arm of the lever 32 carries two pawls 34, 35, the pawl 34 rotating the disc clockwise and the pawl 35 anticlockwise. Therefore, during the operation of the lever-arm, the control disk 30 is turned in one of the two directions of rotation. The following arrange-

ment serves for controlling the pawls 34 and 35:—

On the pin 31 are mounted two cranked levers 36, 37, which can be adjusted in different positions to each other and are provided with pawls 38, 39 extending into the path of movement of the pawls 34, 35.

The pawl 38 operates the pawl 34 during the forward movement and the pawl 39 cooperates with the pawl 35 during the return movement.

The other arms of the levers 36, 37 are provided with stops 36<sup>1</sup>, 37<sup>1</sup>, which engage recesses of control segments 40, 41.

The control segments are adjusted by the keys 42, 43 through the intermediary of link rods 41<sup>1</sup>, 40<sup>1</sup> so that the levers 36, 37 come to rest either in position I or II. For limiting the movements of the levers 36, 37, spring pawls 44, 45 are provided, the noses of which engage in recesses 46, 46<sup>1</sup> on the levers 36, 37 and, during the displacement of the levers 36, 37 are first of all lifted by the control segments. For this purpose each of the pawls 44, 45 has lateral pin 50 which engages in a guide of the control segments.

When one of the keys 42 or 43 is actuated, the corresponding control segment 40 or 41 is actuated and, by means of its guide which controls the pin 50, first of all pulls the nose of the pawl out of engagement with the recess 46, whereupon the lever 36 or 37 is released and can be rocked by the control segment. In the other extreme position of the lever 36 or 37 the pawl 44 or 45 again snaps into the recess 46<sup>1</sup> and holds the lever securely in position. As already mentioned, the column-counters 13, which in their operative position are out of engagement with the actuating members 20, are only moved into engagement therewith, when an item is being entered, during the downward movement of the type bars 1 or the upward movement of the actuating members 20.

Figure 2 shows the position I of the cranked levers 36, 37 of the controlling mechanism, in which the column-counters are being actuated for the entering of an item.

During this cycle of operations, the pawl 34 is lifted from the lower recess of the control disc 30 by the pawl 38, which is situated in the initial position I, immediately at the beginning of the controlling movement of the three-armed lever 32 actuated by the connecting rod 33. During the further rotation of the lever 32 the pawls 34, 35 are moved idly along with it until they drop into the upper recess of the control disc 30 and then rotate this disc during the remainder of the rotary movement of the lever 32 clockwise. By this means the three-armed lever 28 carrying the rollers 27, 27<sup>1</sup> will have been rotated and the movable column-counters 13 swung into engagement with the teeth of the actuating members 20 which are already situated in

their lower end position (Figure 6). During the subsequent return movement of the crank, the pawl 35 will be lifted immediately from the upper recess of the control disc 30 by the pawl 39 of the cranked lever 37 situated in the initial position I, so that the column-counters 13 in question remain constantly in engagement with the actuating members 20 during the upward movement thereof. At the end of the return movement of the crank, the pawls 34, 35, which during the upward movement of the actuating members 20 have been slid over the periphery of the control disc 30 by the lever 32, drop into the lower recess of the control disc under the action of their springs and rotate this disc in the anticlockwise direction into its initial position in which the counters 13 are again out of engagement with the actuating members 20 (Figure 2).

However, before the type bars 1 have reached their highest position or the actuating members 20 their lowest position, the tens flap levers 22 are returned by the return rail 25 (Figure 2).

For this purpose the three-armed lever 32 carries on its third free arm a connecting rod 49 which, by means of a longitudinal slot provided in the latter engages a pin on the return rail 25 and pulls the latter down only during the latter portion of the rotation of the lever 32 in the clockwise direction and thereby causes all the flap levers 22 which have been disengaged to come again into engagement (Fig. 6).

During the following upward movement of the rack bars 20 the flap levers 22 are already in their initial position ready to perform a fresh tens transfer operation.

If a figure which is not to be added (for instance a number or date) is to be printed, then the counters 13, as above mentioned, must remain out of all engagement with the rack bars 20 during the upward movement as well as the return movement of the type bars 1. For this purpose, before connecting up the driving mechanism of the machine, the key 42 is actuated which moves the cranked lever 37 through the medium of the control segment 41 into the position II (Figure 4).

During the movement of the three-armed lever 32 in the clockwise direction, the pawl 34, as above described, is lifted out of the lower recess of the control disc 30 and without influencing the latter is caused to slide over the periphery thereof until it again falls into the upper recess and carries the control disc round with it during the remainder of the rotary movement of the lever 32. The counters 13 moved into engagement in this manner with the rack bars 20, however, at the beginning of the return rotation of the lever 32, during which the control disc 30 is returned by means of the pawl 35 engag-

ing in its upper recess, are immediately moved out of engagement again by the lever 28 (Figure 7).

5 After this angular movement which influences the control disc 30, the pawl 35 is lifted from the upper recess of the control disc by the pawl 39 situated in position II and during the further return rotation of the lever 32 is moved idly until both pawls 34 and 35 arrive at their initial position and fall into the lower recess of the control disc 30. By this means the column counters 13 in question are not in engagement with the rack bars 20 either during the downward movement or the upward movement of the rack bars.

Therefore the calculation mechanism is disengaged and this position is utilized for typing the numbers.

20 If the sub-total key 43 is depressed, the control segment 40 and thus also the lever 36 will be turned, so that the pawl 38 does not interfere with the start of the movement of the pawl 34 carried by the lever 32, so that during this movement the said pawl remains in the corresponding notch or recess of the control-disk and takes along the same, immediately at the beginning of the working stroke, so that the column-counters 13 are moved into the operative position before the racks 20 are operated (Fig. 9). In the outermost position of the lever 32, the pawl 35 engages the notch of the control-disk 30, but is again disengaged (lifted off) during the start of the return movement by the pawl 39, so that the control-disk remains in the position in which the counters 13 engage the racks 20. Just before reaching the initial position, the pawl 35 cooperates with the end of the other notch of the control-disk and turns the same to such an extent, that these counters 13 are disengaged.

45 This position serves for forming intermediate sums, that is, sub-totals. In view of the fact that the counter-wheels, when forming the intermediate sum, engage the racks 20 during the to and fro movement, all counter-wheels are at first adjusted to zero-position, whereby the sum set in the same is printed by the type-bars 1 and also is entered in the counter 8, and subsequently the said counter-wheels are returned again to the amounts contained therein, so that further set amounts may be added thereto.

55 If it is desired to form column-totals, the keys 42 and 43 are depressed and thereby the control-segments 40 and 41 are adjusted and thus the levers 36 and 37 with the pawls 38 and 39 are turned in opposite directions to one another. Therefore the pawl 38 permits the rotation of the pawl 34 to some extent, whereby the latter takes along the control-disk, which during this movement places the counters in engagement (Fig. 8). Now the  
65 pawl 34 strikes the pawl 38 and thus is dis-

engaged so that the control-disk remains at a standstill. When the lever 32 reaches its end position, the pawl 35 drops into the corresponding recess of the control-disk and takes along the same during the return movement, until the pawl 35 is disengaged by the pawl 39. Thereby the counters 13 are again moved out of engagement with their racks, so that the type-bars 1 can move again into their initial position without re-setting the amounts removed from the counter-wheels. The simultaneous depression of the keys 42 and 43 can be carried out by a separate key 48 (total key), which is provided with a transverse bar and cooperates with the levers of both keys 42 and 43.

I claim:—

1. In a typing calculating machine with printing mechanism, a transversely moving paper carriage, a number of movable counters and actuating members therefor, said counters as well as the actuating members being fitted to the outside of the machine behind and below the fixed counters and typing mechanism, a control-disk moving the movable counters into and out of engagement, a pawl-lever operating said control-disk, pawls on said pawl-lever and engaging notches of said control-disk.

2. Machine as claimed in claim 1 further comprising two cranked levers, and dogs controlled by the latter and controlling the pawls on the pawl-lever, so that according to their position the said dogs of the cranked levers disengage the pawls on the pawl-lever from the control-disk either immediately or after a certain length of movement of said pawl-lever only.

In testimony whereof I affix my signature.  
SAMUEL JACOB HERZSTARK.