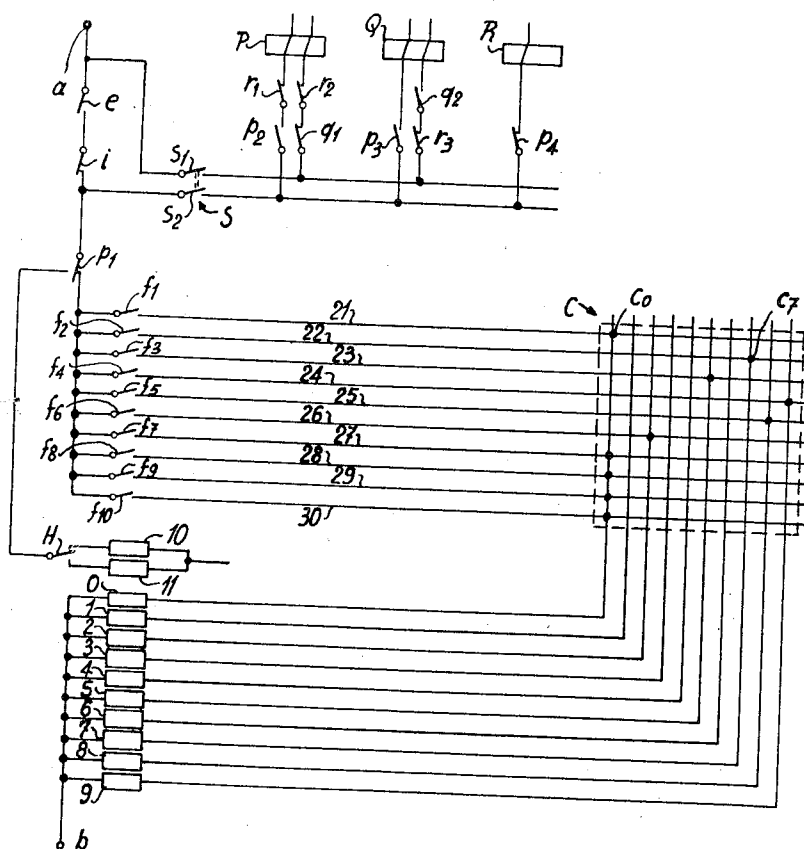


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 TYPEWRITERS OF WHICH THE STRIKING OF THE
 KEYS IS CONTROLLED ELECTRICALLY
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TYPEWRITERS OF WHICH THE STRIKING OF THE KEYS IS CONTROLLED ELECTRICALLY

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Typewriters are already known in which the striking of the keys is controlled automatically, in particular typewriters connected to calculating devices for accounting or invoicing. It is known that in machines of this type the numbers are represented in the form of configuration of electric contacts in the calculating device and are "read," decimal after decimal, by means of impulses controlled by the carriage of the typewriter, so as to influence the electromagnets controlling the typing of the figures.

In accounting or calculating operations, it has been found advantageous to underline some values (totals) or to inscribe a horizontal line, for example at the bottom of a column of figures to be added up so as to separate them from the total of the addition.

In the majority of known machines, it is necessary, when it is desired to draw a horizontal line, to move the carriage to the beginning of the column and to actuate an underlining key, eventually for automatic repetition.

The present invention has for its object a typewriter of which the typing of figures is controlled electrically, particularly an accounting machine, comprising a carriage for supporting at least one sheet which is to be typed, a mechanism for controlling the advance of the carriage step by step, type bars controlled electrically at least for typing the figures and horizontal lines, characterized in that it comprises a device permitting the passing automatically of an electric current for controlling the typing of a horizontal line between each control impulse of the typing of a figure. In this manner, the operator need not return the carriage to the beginning of the column for effecting a horizontal line, as this is typed at the same time as the figure which is to be overlined or underlined.

An electric diagram of a portion of a typewriter, subject of the invention is shown diagrammatically and by way of example in the accompanying drawing.

The typewriter, of which the typing mechanism is not shown in detail, comprises two type bars permitting the typing of a horizontal line above and below, respectively, the typed line. These two type bars are controlled by two electromagnets of which the windings are indicated in the drawing by the numerals 10 and 11. These two type bars are mounted in such a manner as not to provoke an advance movement of the carriage when they are actuated, as is usual in typewriters, for some characters.

The reference numerals 0 to 9 refer to ten electromagnet windings, each of which is adapted to control a type bar for typing one of the figures 0 to 9.

The control circuit for typing figures comprises a terminal *a* for the supply of current, which is connected by three switches, *e*, *i* and *p*₁ to a series of switches *f*₁ to *f*₁₀. The switches *f*₁ to *f*₁₀ are controlled by the carriage of the typewriter in such a manner as to be closed, then opened again in turn, in such a manner that a number of switches are not closed at the same time. These switches *f*₁ to *f*₁₀ permit the supplying of control current for controlling the typing on each of the lines 21 to 30, which lead to a group C of movable contacts which are controlled, for example, by a calculating machine, and which are for the purpose of per-

mitting the passage of the control current through any one of the windings 0 to 9 of the control electromagnets controlling the typing of figures, this current leaving the circuit by the terminal *b*.

This group of contacts C is called stereotype and is not shown in detail, as it is well known in technology.

The functioning of this device is very simple and the circuit shown permits the inscription of a number comprising ten figures. The supply lines 21 to 30 each represent a decimal row of this number and the stereotype is provided, for each of these lines, with a contact placing it in electric connection with one of the windings 0 to 9. When the carriage of the typewriter is in the desired position for the inscription of a number, it provokes, in the known manner, the closing of the switch *f*₁, the switches *i* and *p*₁ being in the normal position. For controlling the inscription of the number contained in the stereotype C, the switch *e* is closed, which permits the current to pass through the line 21, then through the contact *c*₀ and to pass through the winding 0 controlling the typing of a nought. The switch *i* is controlled by the typing mechanism of the machine, in such a manner as to be opened each time a type bar is actuated. It thus provokes an interruption of the current, whilst the actuation of the type bar for the figure zero provokes the advancement of the carriage through one step. This advance of the carriage entrains the opening of the switch *f*₁ and the closing of the switch *f*₂, so that when the switch *i* is reclosed, the current passes through the line 22, then through the movable contact *c*₇, for feeding the winding 7 and provoking the typing of the numeral seven. Each time the carriage is subjected to a movement, one of the switches *f*₁ to *f*₁₀ opens, whilst the following switch closes, so that the device permits the successive reading of the numeral in each of the decimal rows of the number inscribed in the stereotype C.

To permit overlining or underlining at the same time as the inscription of a number, the circuit which has been described also comprises three relays indicated by P, Q and R, a double switch S and a commutator H.

The relay P controls four contacts shown in their normal position and indicated by *p*₁, *p*₂, *p*₃ and *p*₄. The relay Q controls two contacts *q*₁ and *q*₂, and the relay R three contacts *r*₁, *r*₂ and *r*₃.

When a figure is to be overlined or underlined, the double switch S should be closed before the switch *e*, whilst the commutator H is connected to the winding 10 or 11 according as to whether an overlining or underlining is desired. The closing of the double switch S of which each contact is represented by *s*₁ and *s*₂, respectively provokes the excitation of the relay P and, consequently, the closing of the contacts *p*₂ and *p*₃, the opening of contact *p*₄ and the rocking towards the left of the contact *p*₁. The rocking of this latter contact has the effect, when the contact *e* closes, that the current does not pass through the stereotype C but passes directly over one of the windings 10 or 11, which provokes the typing of a horizontal line above or below the line of type.

The closing of the contact *p*₃ energizes the relay Q when the contacts *e* and *i* are closed. This results in the closing of contact *q*₂ which maintains the relay Q in its energized state by reason of the direct derivation of current from the terminal *a* by the contact *s*₁. The contact *q*₁ opens, but the relay P continues to be energized, by reason of its contact *p*₂ which is closed and the contact *r*₁ which has remained closed.

The passage of current into one of the windings 10 or 11 provokes the typing of a horizontal line and, as hereinafter described, the actuated type bar provokes the opening of the switch *i*. As a result the relay P is no longer supplied by *s*₂, *p*₂ and *r*₁, and this relay relaxes, so

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that its four contacts resume their position shown in the drawing. The relay Q has been energized by reason of the closure of q_2 and r_3 .

When the type bar returns to its normal position, it provokes the closing of the switch i , so that the current can pass through one of the switches f_1 to f_{10} , for example through f_1 , then through the stereotype C, so as to provoke the typing of a figure.

At the same time, a current passes through s_2 and p_4 and provokes the energizing of the relay R and, consequently, the opening of the contacts r_1 , r_2 and r_3 . The energizing of the relay Q is cut off, which produces the closing of contact q_1 and the opening of contact q_2 . However, the relay P cannot be energized afresh whilst the switch i is closed, as the energization of the relay R maintains the contacts r_1 and r_2 open. When the switch i opens by reason of the typing of a number, the relay R relaxes, the contacts r_1 , r_2 , r_3 are closed and the relay P is again energized by s_1 , q_1 and r_2 . When the type bar with numeral characters returns to its normal position, the switch i recloses and permits the passing of a fresh impulse of current into the winding 10 or 11 for provoking the overlining or the underlining of the second figure which is depressed. At this moment, the relays P, Q and R are again in the same position as during the first passage of current into the winding 10 or 11, so that the succession of operations which has been described is repeated afresh.

The device described thus permits controlling the typing of a horizontal line above or below the line of typing before each figure which is to be inscribed for forming a number. There thus results a greater rapidity in overlining or underlining of this figure as it is no longer necessary to effect the typing twice or the typing of the figure the first time, as, after having moved the carriage in the starting position.

When the machine comprises a key controlling the inscription of the result of the addition of a number of figures at the bottom of the column, where these figures are inscribed, it is advantageous that the actuation of said key acts on the double switch S so as to provoke the typing of a horizontal line above the number representing the total of the addition. It will be clear that when it is desired to underline a figure, the switch H should be moved into its other position, which is not shown in the drawing. This operation of the switch H may be effected by means of a key, for example for underlining or even in combination with another key of the typewriter of which the lowering should provoke a predetermined operation of which the result should be underlined.

In principle the type bar actuated for the overlining or underlining need not provoke the disengagement of the

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escapement mechanism of the carriage, but it will be understood that when using a typewriter of the usual type, in which this type bar acts on the escapement of the carriage, it is possible to provide a complementary device adapted to maintain the carriage in position when the said type bar is controlled in such a manner as to effect the overlining or the underlining at the same time as the inscription of a number.

I claim:

1. A typewriter in which the typing of numbers is controlled electrically, especially an accounting machine, comprising a carriage for supporting at least one sheet which is to be typed upon, a mechanism for controlling the advance of the carriage step by step, type bars for typing figures and horizontal lines, electromagnets for each respective type bar, an electrical circuit controlling said type bars electrically connected to said electromagnets, said circuit comprising selection contacts each linked respectively to one of said control electromagnets of a respective type bar, a two position switch, said switch providing the supply of current to said selection contacts in one of said two positions, while in the other position, said switch directs the control current to one of said electromagnets controlling a type bar for the typing of a horizontal line, said horizontal line typing not being accompanied by any advancement of the carriage, and a relay responsive to the passage of current operatively associated with the apparatus for controlling the typing of a number, said relay being connected for successive dwell at said two positions of the switch.
2. A machine according to claim 1, in which each electrically controlled type bar acts, during its striking movement, upon a switch to thereby interrupt the current controlling the striking movement, said circuit comprising at least one relay sensitive to each interruption of current, said relay having contacts arranged in two circuits for exciting at least one other relay, said latter relay controlling the movements of the said two position switch.
3. A machine according to claim 1, wherein each of said type bars permit typing of a horizontal line under the line of typing and respective type bars permitting the typing of a horizontal line above the line of typing, and a commutator having two positions, thereby permitting the connection at will of one or the other of the respective two electromagnets respectively controlling the said two type bars.

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