

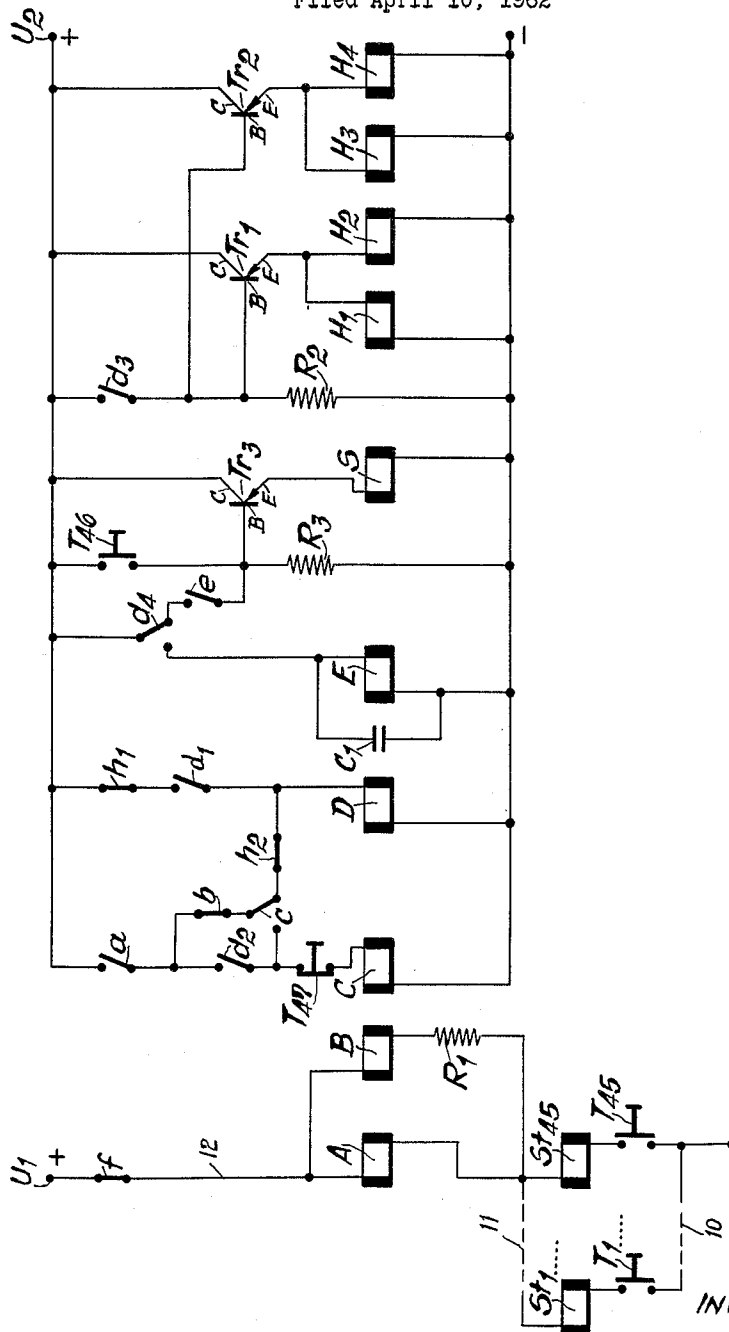
**May 28, 1963**

T. MERTN

**3,091,320**

# CONTROL CIRCUIT ARRANGEMENT FOR ELECTRIC TYPEWRITER

Filed April 10, 1962



**INVENTOR**

Theodor Mertes  
By Michael S. Striker  
Attorney

1

3,091,320

**CONTROL CIRCUIT ARRANGEMENT FOR  
ELECTRIC TYPEWRITER**

Theodor Merten, Wilhelmshaven, Germany, assignor to  
Olympia Werke AG, Wilhelmshaven, Germany  
Filed Apr. 10, 1962, Ser. No. 186,491

Claims priority, application Germany Apr. 10, 1961  
10 Claims. (Cl. 197—13)

The present invention concerns electric typewriters and more specifically a control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated.

The invention is concerned with the task of rendering the type writer insensitive to the manner in which the typist operates the keyboard, and of accomplishing the desired result by comparatively very simple means.

It is well known that the keyboard of an electric typewriter may be operated in various ways, there being two distinct extremes of types of operation and an unlimited number of inbetween types where the characteristics of the extreme types blend with each other. One type of operation is comparable to the style of playing a piano and called "staccato" while in the same manner an other extreme would be comparable to playing "legato." Of course, in typing the "staccato" type of operation is most desirable and is most generally taught because in this manner each individual key is operated individually one after the other, while in "legato" typing, one key may still be held down in depressed position while already another key is being actuated so that the actuations of the corresponding two type levers overlap which causes at least jamming of the type levers. The same would occur if under extreme conditions two keys are being depressed simultaneously. This simultaneous operation of two keys may apply to two keys or type levers which are located adjacent to each other as well as to two keys or levers which are located rather spaced from each other.

In conventional electric typewriters the undesirable consequences of "legato" typing or of an inadvertent simultaneous operation of more than one key are not safely prevented or at least not prevented by simple and efficient means.

It is therefore an object of this invention to provide for a control circuit arrangement for an electric typewriter of the type set forth wherein in the case of a key being depressed before the previously depressed key has been released, the actuation of the type lever corresponding to the second depressed key is delayed until the actuation of the type lever corresponding to the previously depressed key is completed.

It is another object of this invention to provide for an arrangement of the type set forth whereby in the case of simultaneous depression of more than one key the actuation of the corresponding type levers is entirely blocked.

It is still another object of this invention to provide for an arrangement as set forth wherein repeated operation of one particular type lever is made possible without repeated operation of the corresponding key, although this last mentioned object seems to be in conflict with the first mentioned object.

Wherever in the past typewriters have been produced with means for preventing the above-mentioned undesirable performances, purely mechanical blocking means have been used which, however, are rather involved and costly. Therefore it is a very substantial advantage derived from the present invention that these mechanical blocking means are replaced by purely electrical means in a very simple manner, at less manufacturing cost and with considerably reduced space requirements within the typewriter.

2

With above objects in view the invention includes a control circuit arrangement for an electric typewriter having electromagnetically actuatable levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination, main electromagnet means for actuating any of the type levers depending upon depression of a corresponding key and including a plurality of electrical selector means individually actuatable by the corresponding selector switch for causing respectively corresponding type levers to be actuated; first control relay means for causing, upon energization thereof, energization of said main electromagnet means; main relay means arranged to be energized simultaneously with the actuation of any single one of said plurality of electrical selector means, and for causing, upon energization thereof, energization of said first control relay means; electrical means for deenergizing said first control relay means immediately after a type lever has been actuated by said main electromagnet means; second control relay means connected to be energizable when said main relay means and said first control relay means are simultaneously in energized condition and including means for holding said second control relay means energized when said first control relay means is deenergized and as long as said main relay means is in energized condition after energization of said second control relay means, while simultaneously deenergizing said first control relay means; and electrical means operable in parallel with said main relay means for preventing energization of said first control relay means by said main relay means when more than one of said electrical selector means is energized simultaneously.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing in which the invention is illustrated by a schematic circuit diagram.

For the sake of completeness the drawing contains also certain elements constituting a stepping control which is not part of the invention. The various relays are illustrated by a coil designated by a capital letter while the contacts operated by energization of the respective coil are designated by the respectively corresponding small letter, in the case of a plurality of relay contacts supplemented by a suffix number.

A plurality of key operated selector switches respectively associated with corresponding type levers, not shown, are illustrated only by two selector switches  $T_1$  and  $T_{45}$  assuming that in the present example a total number of 45 keys are arranged on the keyboard of the typewriter. These selector switches serve in the conventional manner to select the type levers to be actuated. The individual selector switches  $T_1$  to  $T_{45}$  act to selectively energize the respectively associated selector electromagnet means  $S_{t_1}$  to  $S_{t_{45}}$ , each of which is adapted to couple through its armature (not shown) the respectively corresponding type lever with an actuator (not shown), the latter being caused to carry out an operative stroke upon energization of at least one main electromagnet means (in the present example represented by a plurality of such main electromagnets  $H_1$  to  $H_4$ ) so that in this manner the selected type lever is actuated. Details of the mechanical type lever control are not shown because they do not constitute part of this invention.

It can be seen that all the series combinations of a selector switch  $T_n$  and a selector electromagnet  $S_{t_n}$  are connected in parallel with each other between bus bar lines 10 and 11, the latter being connected by line 12

to the positive terminal of a source of direct current voltage  $U_1$  while line 10 is connected to the corresponding negative terminal. Connected in line 12 is the coil A of a main relay so that the latter is connected in series with each individual one of the plurality of selector electromagnet means  $St_1$  to  $St_{45}$ . A safety relay is provided for preventing actuation of any one of the type levers in case more than one of the selector switches  $T_1$  to  $T_{45}$  is actuated simultaneously i.e. when more than one of the selector electromagnets  $St_1$  to  $St_{45}$  is energized simultaneously, as will be described further below. This safety relay includes a coil B connected in series with a resistor  $R_1$ , both being connected in parallel with the coil A. The parameters of the coil B and of the resistor  $R_1$  are so chosen that the safety relay i.e. the coil B can be energized for moving its relay contact  $b$  from its normally closed position to open position only when more than one of the selector magnets  $St_1$  to  $St_{45}$  is energized simultaneously. A normally closed contact  $f$  is arranged in the line 12 and this contact  $f$  is opened by means not shown whenever the carriage of the typewriter is shifted so that the actuation of a type lever during the shifting of carriage is prevented.

The main relay coil A operates a normally open relay contact  $a$  located in a second circuit arrangement as shown and supplied with direct current voltage from a source  $U_2$ . When the other contacts shown in this second circuit arrangement are in the positions shown in the drawing, the closing of the contact  $a$  results in energization of a first control relay coil D. The energizing circuit for this coil D contains a normally closed relay contact  $b$  movable to open position by energization of the above mentioned safety relay coil B, a change-over relay contact  $c$  in its normal position, and a normally closed contact  $h_2$  which is moved by means not shown to open position when by energization of the corresponding one of the main electromagnet  $H_1$  to  $H_4$  a type lever has been actuated so that the opening of contact  $h_2$  indicates that one particular type lever actuation has been completed.

When the first control relay coil D is energized the associated normally open relay contact  $d_1$ ,  $d_2$  and  $d_3$  are moved to closed position and the change-over relay contact  $d_4$  is moved from its normal position as shown to its second position. The closing of relay contact  $d_1$  causes flow of current through coil D via the normally closed contact  $h_1$  which is opened, simultaneously with the above mentioned contact  $h_2$  when a type lever has been actuated by energization of the respective main electromagnet  $H_1$  to  $H_4$ . It can be seen that the closing of contact  $d_1$  results in holding the relay coil D in energized condition until the contacts  $h_1$  and  $h_2$  are moved to open position after the termination of a type lever actuation.

After the closing of the main relay contact  $a$  the closing of the normally open relay contact  $d_2$  caused by energization of the coil D results in energization of the second control relay coil C whereby its change-over contacts  $c$  is moved from the shown normal position into its second position whereby the relay coil C is held in energized condition as long as the contacts  $a$  and  $b$  are in closed position, even if thereafter the relay contact  $d_2$  returns to its normal open position because the closed contact  $b$  and the contact  $c$  in its second position constitute a bypass or shunt relative to the relay contact  $d_2$ .

The closing of the normally open relay contact  $d_3$  causes through the connections as shown the transistors  $Tr_1$  and  $Tr_2$  to become conductive whereby through the network shown the corresponding ones of the main electromagnets  $H_1$  to  $H_4$  are energized and the previously selected type lever is actuated. As a consequence now the normally closed contact  $h_1$  and  $h_2$  are opened so that now the first control relay coil D is deenergized, its re-

lay contacts  $d_1$  to  $d_4$  are returned to their normal position whereby also the second control relay coil C is deenergized.

Previously the moving of the change-over relay contact  $d_4$  to its second position has caused the energization of the stepping relay coil E whereby its associated normally open relay contact  $e$  was moved to closed position. While the change-over contact  $d_4$  is in its second position the capacitor  $C_1$  connected in parallel with coil E is charged. When now relay coil D is deenergized its change-over contact  $d_4$  returns to its normal position as shown and the coil E is disconnected from the supply circuit. However it remains in energized condition and contact  $e$  remains in closed condition until the capacitor  $C_1$  has discharged so that during this discharge time the transistor  $Tr_3$  is rendered conductive whereby the stepping magnet S is energized and actuates the not shown stepping device of the typewriter. At the end of the discharge time of the capacitor  $C_1$  the stepping relay coil E is deenergized, its contact  $e$  turns to open position so that now all the components of the entire circuit arrangement are again in their original condition and ready for the next following type lever actuation.

The transistors  $Tr_1$  to  $Tr_3$  and the biasing resistors  $R_2$  and  $R_3$  are so constructed and dimensioned in a well known manner that the transistors operate within the circuit shown in the manner set forth above. Additional biasing resistors may be provided but are not shown in order not to encumber the drawing.

A push button switch  $T_{47}$  or the equivalent thereof is arranged in the circuit between the second control relay coil C and the normally open relay contact  $d_2$ . Normally the switch  $T_{47}$  is in closed position as shown. The switch  $T_{47}$  serves to cause repeat actuation of a selected type lever continuously as long as the corresponding selector switch  $T_n$  is held in depressed i.e. closed position. In this manner for instance underscoring or rows of periods or any other characters available in the typewriter may be produced. When the switch  $T_{47}$  is moved to open position the above described energization of the first control relay D upon actuation of one of the selector switches  $T_n$  does not result in moving the change-over contact  $c$ , and since main relay contact  $a$  is held in closed position by the continuous energization of the main relay A, the return of the contacts  $h_1$  and  $h_2$  to closed position after completion of one type lever actuation causes immediately another energization of the first control relay coil D whereby the above described energization of the respective main electromagnet  $H_1$  to  $H_4$  and of the stepping magnet coil S is repeated until either the respectively depressed selector switch  $T_n$  or the switch  $T_{47}$  is released and returned to normal position. In the first case the main relay contact  $a$  returns to open position and thus prevents further energization of the first control relay control D, and in the other case the closing of the switch  $T_{47}$  results only in one more energization of the first control relay coil D and after the actuation of the respective type lever the above-described opening of the contacts  $h_1$  and  $h_2$  causes deenergization of the relay coil D and return of the entire arrangement to its normal starting condition.

If it is desired to avoid the necessity of holding the repeat operational switch  $T_{47}$  in open position together with simultaneous holding of the respective key operated selector switch  $T_n$  in closed position, the push-button switch  $T_{47}$  may be provided with conventional arresting means so as to hold this switch in open position until it is intentionally released again. It can be seen that the arrangement according to the invention as just described entails the substantial advantage that repeat actuation of a type lever can be accomplished with extremely simple means while in known typewriter control arrangements rather involved special devices must be provided in connection with selected type levers. Thus this arrangement is advantageously simplified in this respect and

yields the further advantage that the single switch  $T_{47}$  is sufficient to cause repeat actuation of any one of the existing type levers of the typewriter.

For the sake of completeness a further normally open switch  $T_{46}$  may be provided in parallel with the above described contacts  $d_4$  and  $e$  so that by closing the switch  $T_{46}$  a single step movement of the carriage of the typewriter can be effected by energization of the stepping magnet coil S.

In operation the arrangement according to the invention functions as follows:

In normal operation when, as is most desirable, only one of the key operated selector switches  $T_1$  to  $T_{45}$  is actuated at a time, first only the main relay coil A is energized causing the closing of the contact  $a$  whereby via  $b$ ,  $c$ , and  $h_2$  the first control relay coil D is energized, which in turn causes energization of the respective main electromagnet  $H_1$  to  $H_4$  and actuation of the selected type lever. At the same time change-over contact  $d_4$  is moved with the consequence of energizing the stepping magnet S as described above, and the holding contact  $d_1$  is closed so as to hold the coil D in energized condition until the contact  $h_1$  is moved to open position after the energization of a type lever by at least one of the coils  $H_1$  to  $H_4$ . The return of the contact  $c$  to original position occurs only after the release of the respective key operated selector switch  $T_n$  has deenergized the main relay A and thereby opened the main relay contact  $a$ . In the meantime the completion of the key lever actuation has opened the contact  $h_1$  and  $h_2$  and thereby deenergized the first control relay coil D. Since the second control relay C holds itself energized by the changeover contact  $c$  moved to its second position it makes no difference how long the respective key operated selector switch is held in closed position i.e. how long the main relay contact  $a$  is held in closed position because the circuit between  $a$  and  $h_2$  is interrupted by  $c$ .

There are two possibilities of irregular operation. First, it is possible that a second key operated selector switch  $T_n$  is actuated before the previously actuated key operated selector switch has been released. In this case the actuation of the first one of the key operated selector switches starts the above described cycle of operations. However, as soon as the second key operated selector switch is actuated the safety relay coil B is energized and contact  $b$  is opened and the holding circuit or shunt composed of the contact  $b$  and the contact  $c$  in second position is interrupted. Contact  $c$  returns to normal position and after the first actuated selector switch has been released and the actuation of the corresponding type lever has been completed while the main relay contact  $a$  remains in closed position due to the continued actuation of the second selector switch the energizing circuit for the first control relay coil D is again established via  $a$ ,  $b$ ,  $c$ , in normal position and  $h_2$ , because in the meantime the contact  $b$  has returned to its normal position since the safety relay coil B has been deenergized as soon as the first actuated selector switch was released. Thus, now the above described operation is carried out properly so as to actuate the key lever corresponding to the second actuated selector switch.

The second possibility of irregular operation consists in an inadvertent simultaneous actuation of at least two or more of the key operated selector switches  $T_1$  to  $T_{45}$ . In this case the safety relay coil B is energized simultaneously with the main relay coil A, but although the relay contact  $a$  is closed simultaneously the safety relay contact  $b$  is opened whereby an energization of the first control relay D and therefore any actuation of any one of the key levers is prevented at the outset.

It can be seen from the above that the arrangement according to the invention provides in a comparatively very simple manner not only for carrying out all desired normal operations of an electric typewriter, including

the above described advantage in repeat actuation of any one of the existing type levers, but also prevents any undesirable malfunction in case that the time periods of actuation of different key operated selector switches overlap, or even if two or more of these key operated selector switches are actuated simultaneously, no matter whether the respective keys or type levers are adjacent to each other or separated from each other.

It will be understood that each of the elements described above or two or more together, may also find a useful application in other types of control circuit arrangements for an electric typewriter differing from the types described above.

While the invention has been illustrated and described as embodied in control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed and desired to be secured by Letters Patent is:

1. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,

a. main electromagnet means for actuating any of the type levers depending upon depression of a corresponding key and including a plurality of electrical selector means individually actuatable by the corresponding selector switch for causing respectively corresponding type levers to be actuated;

b. first control relay means for causing, upon energization thereof, energization of said main electromagnet means;

c. main relay means arranged to be energized simultaneously with the actuation of any single one of said plurality of electrical selector means, and for causing, upon energization thereof, energization of said first control relay means;

d. electrical means for deenergizing said first control relay means immediately after a type lever has been actuated by said main electromagnet means;

e. second control relay means connected to be energizable when said main relay means and said first control relay means are simultaneously in energized condition and including means for deenergizing said first control relay means while simultaneously holding said second control relay means energized, after said first control relay means is deenergized, as long as said main relay means is in energized condition after energization of said second control relay means; and

f. electrical means operable in parallel with said main relay means for preventing energization of said first control relay means by said main relay means when more than one of said electrical selector means is energized simultaneously.

2. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,

a. main electromagnet means for actuating any of the type levers depending upon depression of a corre-

- sponding key and including a plurality of electrical selector means individually actuatable by the corresponding selector switch for causing respectively corresponding type levers to be actuated;
- b. first control relay means for causing, upon energization thereof, energization of said main electromagnet means;
  - c. main relay means arranged to be energized simultaneously with the actuation of any single one of said plurality of electrical selector means, and for causing, upon energization thereof, energization of said first control relay means;
  - d. electrical means for deenergizing said first control relay means immediately after a type lever has been actuated by said main electromagnet means; and
  - e. second control relay means connected to be energizable when said main relay means and said first control relay means are simultaneously in energized condition and including means for deenergizing said first control relay means while simultaneously holding said second control relay means energized, after said first control relay means is deenergized, as long as said main relay means is in energized condition after energization of said second control relay means.
3. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,
- a. main electromagnet means for actuating any of the type levers depending upon depression of a corresponding key and including a plurality of electrical selector means individually actuatable by the corresponding selector switch for causing respectively corresponding type levers to be actuated;
  - b. first control relay means for causing, upon energization thereof, energization of said main electromagnet means;
  - c. main relay means arranged to be energized simultaneously with the actuation of any single one of said plurality of electrical selector means, and for causing, upon energization thereof, energization of said first control relay means;
  - d. electrical means for deenergizing said first control relay means immediately after a type lever has been actuated by said main electromagnet means;
  - e. second control relay means connected to be energizable when said main relay means and said first control relay means are simultaneously in energized condition and including means for deenergizing said first control relay means while simultaneously holding said second control relay means energized, after said first control relay means is deenergized, as long as said main relay means is in energized condition after energization of said second control relay means; and
  - f. safety relay means including a safety relay coil connected and constructed for being effectively energized simultaneously with said main relay means only when more than one of said electrical selector means is energized simultaneously, and means controllable by said safety relay coil so as to prevent energization of said first control relay means by said main relay means when more than one of said electrical selector means is energized simultaneously.
4. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,
- a. at least one main electromagnet means for actuating any of the type levers upon energization of said main electromagnet means;
  - a'. a plurality of selector electromagnet means, each in circuit with a different one of the key operated selector switches for selectively causing a selected type

- lever to be actuated by said main electromagnet means when the corresponding selector switch is actuated by depression of the respective key;
- b. first control relay means including first normally open contact means in circuit with said main electromagnet means and movable to closed position upon energization of said first control relay means so as to cause energization of said main electromagnet means;
  - c. a main relay means including a main relay coil connected in series with each individual one of said plurality of selector electromagnet means so as to be energized when any one of said selector electromagnet means is energized, and second normally open contact means in circuit with said first control relay means for energizing the latter when said second normally open contact means is moved to closed position by energization of said main relay coil;
  - d. normally closed contact means arranged in circuit with said first control relay means and movable to open position by said main electromagnet means when the latter is fully energized so as to deenergize said first control relay means when a type lever has been actuated;
  - e. second control relay means including a second relay coil connected also in circuit with said second normally open contact means, a third normally open contact means being connected between said second normally open contact means and said second relay coil and movable to closed position upon energization of said first control relay means, change-over relay contact means being connected between said second normally open contact means and said first control relay means and said second relay coil and movable from a first normal position in which said second normally open contact means is connected with said first control relay means, to a second position in which it establishes a holding connection in parallel with said third normally open contact means upon energization of said second relay coil thereby holding the latter energized when said third normally open contact means returns to open position and as long as said second normally open contact means is in closed position after energization of said second relay coil, while simultaneously interrupting in said second position the connection between said second normally open contact means and said first control relay means; and
  - f. electrical means connected in parallel with said main relay means for interrupting the connection between said second normally open contact means and said first control relay means when more than one of said selector electromagnet means is energized simultaneously.
5. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,
- a. at least one main electromagnet means for actuating any of the type levers upon energization of said main electromagnet means;
  - a'. a plurality of selector electromagnet means, each in circuit with a different one of the key operated selector switches for selectively causing a selected type lever to be actuated by said electromagnet means when the corresponding selector switch is actuated by depression of the respective key;
  - b. first control relay means including first normally open contact means in circuit with said main electromagnet means and movable to closed position upon energization of said first control relay means so as to cause energization of said main electromagnet means;

- c. a main relay means including a main relay coil connected in series with each individual one of said plurality of selector electromagnet means so as to be energized when any one of said selector electromagnet means is energized, and second normally open contact means in circuit with said first control relay means for energizing the latter when said second normally open contact means is moved to closed position by energization of said main relay coil;
- d. normally closed contact means arranged in circuit with said first control relay means and movable to open position by said main electromagnet means when the latter is fully energized so as to deenergize said first control relay means when a type lever has been actuated; and
- e. second control relay means including a second relay coil connected also in circuit with said second normally open contact means, a third normally open contact means being connected between said second normally open contact means and said second relay coil and movable to closed position upon energization of said first control relay means, change-over relay contact means being connected between said second normally open contact means and said first control relay means and said second relay coil and movable from a first normal position in which said second normally open contact means is connected with said first control relay means, to a second position in which it establishes a holding connection in parallel with said third normally open contact means upon energization of said second relay coil thereby holding the latter energized when said third normally open contact means returns to open position and as long as said second normally open contact means is in closed position after energization of said second relay coil, while simultaneously interrupting in said second position the connection between said second normally open contact means and said first control relay means; and
- f. safety relay means including a safety relay coil connected in parallel with said main relay coil and being effectively energizable simultaneously with said main relay coil only when more than one of said selector electromagnet means is energized simultaneously, and a normally closed safety relay contact means arranged between said second normally open contact means and said change-over relay contact means for interrupting the connection between said second normally open contact means and said first control relay means when more than one of said selector electromagnet means is energized simultaneously.
7. An arrangement as claimed in claim 4, including normally closed switch means in circuit with said second relay coil for preventing by opening said switch means energization of said second control relay means upon closing of said second normally open contact means, so that by simultaneously holding any one of the key operated selector switches in actuated position and holding said switch means in open position the actuation of the type lever corresponding to said one selector switch is automatically and continuously repeated until at least one of said simultaneously held switches is released.
8. An arrangement as claimed in claim 7, wherein said normally closed switch means are provided with arresting means for holding the same in open position after actuation.
9. An arrangement as claimed in claim 5, including normally closed switch means in circuit with said second relay coil for preventing by opening said switch means energization of said second control relay means upon closing of said second normally open contact means, so that by simultaneously holding any one of the key operated selector switches in actuated position and holding said switch means in open position the actuation of the type lever corresponding to said one selector switch is automatically and continuously repeated until at least one of said simultaneously held switches is released.
10. An arrangement as claimed in claim 9, wherein said normally closed switch means are provided with arresting means for holding the same in open position after actuation.
6. Control circuit arrangement for an electric typewriter having electromagnetically actuatable type levers and key operated selector switches for selecting the type lever to be actuated, comprising, in combination,
- a. at least one main electromagnet means for actuating any of the type levers upon energization of said main electromagnet means;
- a'. a plurality of selector electromagnet means, each in circuit with a different one of the key operated selector switches for selectively causing a selected type lever to be actuated by said main electromagnet means when the corresponding selector switch is actuated by depression of the respective key;
- b. first control relay means including first normally open contact means in circuit with said main electromagnet means and movable to closed position upon energization of said first control relay means so as to cause energization of said main electromagnet means;
- c. a main relay means including a main relay coil connected in series with each individual one of said plurality of selector electromagnet means so as to be energized when any one of said selector electromagnet means is energized, and second normally open contact means in circuit with said first control relay means for energizing the latter when said second normally open contact means is moved to closed position by energization of said main relay coil;
- d. normally closed contact means arranged in circuit with said first control relay means and movable to open position by said main electromagnet means when the latter is fully energized so as to deenergize said first control relay means when a type lever has been actuated;

## References Cited in the file of this patent

## UNITED STATES PATENTS

2,712,101	Salati	June 28, 1955
2,787,740	Helmert	Apr. 2, 1957
2,869,703	Hebel	Jan. 20, 1959
2,971,135	Ebert	Feb. 7, 1961