Oct. 30, 1962 E. BACHER 3,061,187

DEVICE FOR THE CONTROL OF OPERATIONS, PARTICULARLY FOR A TYPEWRITER

Filed Aug. 8, 1960

FIG. 1

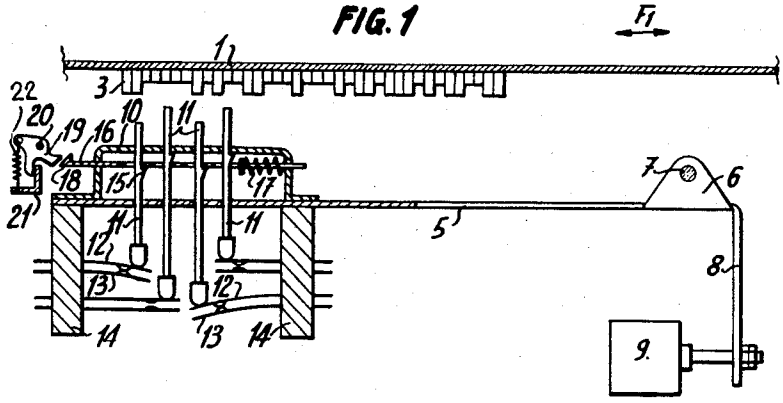
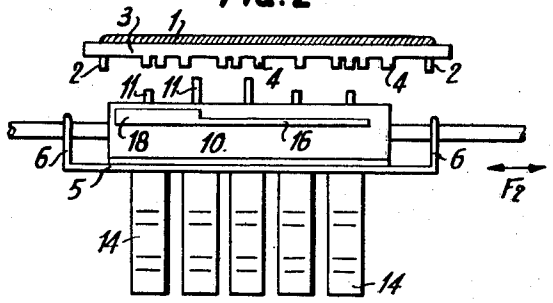


FIG. 2



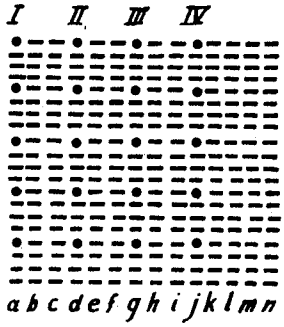


FIG. 3

INVENTOR.
ERIC BACHER
By Emery P. Doff Atty

United States Patent Office 3,061,187 Patented Oct. 30, 1962

3,061,187

DEVICE FOR THE CONTROL OF OPERATIONS, PARTICULARLY FOR A TYPEWRITER

Eric Bacher, Yverdon, Switzerland, assignor to Paillard S.A., Sainte-Croix, Switzerland, a corporation of Switzerland

Filed Aug. 8, 1960, Ser. No. 48,122
Claims priority, application Switzerland Aug. 22, 1959
8 Claims. (Cl. 235—60.5)

Devices are already known for the control of operations, particularly for a typewriter, comprising a recording member carrying a number of elements, of which the shape or the position is determined by functions which should be capable of being controlled, a device for the control with movable members being capable of cooperating with the elements of the recording member to read at least one function, means being provided for controlling a relative movement between the recording member and the control device for permitting of selecting the function which is to be transmitted.

In known constructions, the control device should remain in contact with the elements of the recording member until the function is transmitted to the different parts which are to be actuated. Consequently, the control device should remain in contact with the recording member during a relatively long period of time, which frequently leads to a slowing down of the speed of operation of the machine. Thus, in accounting machines, of which a portion corresponds with a typewriter, the recording member is often carried by the carriage of the machine, and the control device can come into contact with the recording member to read one of the numerous functions, the selection of the function being determined at least by the position of the carriage on the typewriter. The typewriter is utilised for the inscription of words and figures and it is often necessary to retain the indication of a function to be executed during typing, that is to say during the movement of the carriage, this function may, for example, be the control of typing in capital letters.

The object of the present invention is to permit of a simplification of the typewriter, by reason of the fact that the control device has retaining means for its movable members enabling these to be retained in the positions, which they have taken up when co-operating with the elements of the recording member.

One form of construction of the subject of the invention is shown diagrammatically and by way of example in the accompanying drawings, wherein:

FIG. 1 is a longitudinal diagrammatic view of this form of construction.

FIG. 2 is a transverse view, a portion of the device being omitted.

FIG. 3 is an explanatory diagram.

With reference to FIG. 1, the illustrated function control means comprises program means including a part **1** which may be moved longitudinally, as indicated by the double arrow F1. In the case of an accounting machine this part **1** may, for example, be secured, to the carriage of the machine. As shown in FIG. 2, the part **1** is formed by a plate with bent blades **2** and it carries a series of parallel elongated plates **3** of a material capable of being broken or cut easily, for example of nylon, synthetic resin or tempered steel. Each plate **3** has teeth **4**, the presence or the absence of each tooth permitting of defining a value of determination of a function. By reason of the fact that the material may be broken or cut easily, it is possible to provide plates **3** having a complete series of teeth **4**, and it is possible to remove some of these teeth by breaking them off, or cutting them at their base by means of pliers, for obtaining a registering of the

functions which the machine should be capable of effecting.

Underneath the function control means is placed a control device which comprises a plate **5** having two bent lugs **6** by means of which it can pivot about a stationary spindle **7**. This plate **5** has a bent portion **8**, of which the end may be moved by means of an electromagnet **9**. A second plate **10** is secured to the plate **5**, these two plates having holes in which can slide parallel fingers **11** which constitute the movable members of the control device. The lower part of each of these fingers rests on a resilient blade **12** constituting an electric contact with a parallel blade **13**. The blades **12** and **13** are embedded in insulating blocks **14** secured to the plate **5**. Further, each finger has a lateral locking projection **15**, capable of co-operating with a transverse locking grid **16**, common to all of the fingers and urged against them by a spring **17**. This grid has a portion **18**, in the form of a ramp, adapted to co-operate with a pawl **19** (only shown in FIG. 1) oscillating about a stationary spindle **20** and maintained against a stop **21** by a spring **22**. The fingers **11** are disposed in four rows of five fingers each, each row being directed parallel to the plates **3** and adjacent fingers of a row spanning a distance equivalent to a multiple of the pitch of two closely arranged teeth of one and the same plate. In the form of construction described and with reference to FIG. 2, it will be seen that the span of two fingers **11** is four times larger than the pitch of two closely arranged teeth of the plate, so that by moving the control device in a direction parallel to the row of fingers, it is possible to place it in four different positions, whereby the said fingers are permitted to co-operate each time with groups of different teeth of the plates **3**. This movement of the control device, in the direction of the arrow F2 is obtained by causing the plate **5** to slide on the spindle **7** by means of a control mechanism, not shown, which can easily be conceived by any skilled operator.

From FIG. 1, it will also be observed that adjacent rows of fingers span a number of plates **3**. In the case shown, this number is equal to three.

In FIG. 3 is shown, very diagrammatically, a series of plates **3** indicated by the letters *a* to *n*, as also the fingers of the control device, these fingers being arranged in four rows indicated by I, II, III and IV and represented by dots, whilst the teeth **4** of the plates **3**, which are not located opposite the fingers, are represented by dashes. The rows of fingers I, II, III, IV are placed respectively opposite plates *a*, *d*, *g* and *j*. In this position, it is possible to select between four different functions, by moving the control device in a direction parallel to the rows of fingers. The pitch of the plates is selected in such a manner that when the carriage advances through one step, a relative movement is produced between the control device and the program means, this movement being equal to four times the pitch of adjacent plates. Thus, when the carriage is caused to advance through one step, relatively to the illustration in FIG. 3, the rows of fingers move, for example, towards the right, all to the same extent, so that the row I is opposite the plate *e*, the row II opposite the plate *h*, the row III opposite the plate *k* and the row IV opposite the plate *n*. When the carriage is moved through one more step, the row I of fingers will come opposite the plate *i*, then for a fresh movement opposite the plate *m*.

It will be seen that this arrangement permits of recording four functions for each position that the carriage of the machine is capable of occupying, these four functions may be selected in a very large number of different functions. In fact, in the form of construction shown, the twenty fingers of the control device may each occupy two different positions, so that it is possible, theoretically,

to define by means of these twenty fingers 2^{20} different functions, that is to say 1,048,576.

The function control means described operates in the following manner:

When the carriage is stopped and a function is to be selected, the plate **5** is moved in the direction of the arrow F2 (FIG. 2) in such a manner that the fingers are located opposite the teeth **4** which define the function selected, then a current impulse is passed into the electromagnet **9**. The action of this latter causes the plates **5** to pivot in a clockwise direction around the spindle **7** until the fingers **11** abut against the plates **3** and read the operation which is determined by the recessed and projecting parts of the plates, that is to say by the presence or absence of some of the teeth **4**.

During the course of this pivoting of the plates **5**, the part **18** of the grid **16** abuts against the pawl **19** in the form of a beak, whereby this grid is moved towards the right against the action of its spring **17**, in such a manner as to release all the fingers **11** which are urged upwardly under the action of their respective blade **12**. The highest position of the control device is such that the end **18** of the grid passes the beak of the pawl **19** in such a manner that the grid **10** is repelled towards the left under the action of the spring **17**. It thus results that the fingers which have met a tooth **4** and which have thus been moved downwards against the action of their blade **12**, are maintained in this position by the action of the locking grid **16** on their projections **15**. The control device may then be withdrawn immediately from the program means and each finger retains the position assumed on contact of the plates **3**. In fact, during the return of the plate **5** to the position shown in the drawing, the part **18** of the grid **16** abuts against the pawl **19** and causes it to pivot against the action of its spring **22**, so that it does not release the fingers **11** during the return movement of the plate.

It will be understood that it is possible to make numerous modifications of the function control means described. Thus the program means including the part **1** carrying the plates **3** may be stationary, whilst means could be provided to permit of moving the control device along this part. The plates **3** may also be replaced by movable elements each capable of occupying at least two positions, these elements being capable of being placed in one or other of their positions for determining the function which it is desired to be effected. The means for retaining the fingers **11** in position may also be realised in a different manner and it is possible, for example, to provide simply two notches on each finger for maintaining it in one or other of these two positions. In this case the control device should comprise a member adapted to repel all of the fingers **11** upwardly before causing them to again cooperate with the recessed and projecting parts of the plates **3**.

I claim:

1. Function control means for a machine, such as an accounting machine, comprising a recording member, a plurality of plates carried by said recording member, teeth carried by the plates, said teeth being so shaped and positioned as to provide the operative functions for controlling the machine operations and said teeth being arranged to obtain desired recording results, a plurality of movable fingers, a device for the control of said movable fingers, said fingers being capable of cooperating with said plates to read at least one operative function, actuating means for causing a relative movement between said recording member and said finger control device for permitting selection of the function to be transmitted, said movable fingers coming into contact at their respective ends with said teeth when said finger control device and said recording member are moved towards one another by said actuating means, spring means biasing each finger in the direction of said recording member, a locking member formed laterally on each of said fingers for maintaining the same in position when moved against the bias action of said spring means by the teeth of said recording member during said relative movement of said finger control device and of said recording member towards one another, a movable locking grid common to all of said fingers for cooperation with said respective lateral locking members, a spring for urging said grid into engagement with said fingers in the path of said locking members, and means adapted to move said grid against the action of said spring upon relative movement of said finger control device and of said recording member towards one another, to thereby release all of said fingers.

2. Function control means for a machine, such as an accounting machine, said means comprising a control device for controlling the operation of the machine, said control device including a support, a plurality of parallel fingers mounted for axial sliding displacement relatively to said support between a first position and a second position and guided by said support, spring means biasing each finger into said first position, and locking means for holding said fingers in said second position when moved from said first position to said second position, said locking means including a lateral catch on each of said fingers, a locking grid common to all of said fingers and mounted on said support for movement transversely of said fingers, and a spring for urging said grid into engagement with said movable fingers in the path of said lateral catches so as to engage the latter when said fingers reach said second position; program means including a plurality of parallel elongated plates normal to said fingers and normally spaced therefrom, said plates having teeth selectively arranged therealong in accordance with the operations to be carried out by the machine; actuating means for relatively moving said control device and said program means towards one another whereby selected fingers can be moved by said teeth from said first position to said second position against the action of said spring means; and finger release means for moving said grid out of the path of said lateral catches against the action of said spring upon relative movement of said control device and said program means towards one another whereby all of said fingers may be brought to said first position by the time said relative movement is completed.

3. Function control means for a machine, such as an accounting machine, said means comprising a movable control device for controlling the operation of the machine, said control device including a support, a plurality of parallel fingers mounted for axial sliding displacement relatively to said support between a first position and a second position and guided by said support, spring means biasing each finger into said first position, and locking means including a lateral catch on each of said fingers, a locking grid common to all of said fingers and mounted on said support for movement transversely of said fingers, and a spring for urging said grid into engagement with said movable fingers in the path of said lateral catches so as to engage the latter when said fingers reach said second position, said locking grid having at one of its ends a ramp; program means including a plurality of parallel elongated plates normal to said fingers and normally spaced therefrom, said plates having teeth selectively arranged therealong in accordance with the operations to be carried out by the machine; actuating means for moving said control device towards said program means whereby selected fingers can be moved by said teeth from said first position to said second position against the action of said spring means; and finger release means for moving said grid out of the path of said lateral catches against the action of said spring upon movement of said control device towards said program means whereby all of said fingers may be brought to said first position by the time said relative movement is completed, said finger release means including a pin which is stationary relatively to said movable control device, a pivotal member mounted on said pin and having a part projecting in the path of

said ramp in the course of movement of said control device towards and away from said program means, a stop for preventing rotation of said pivotal member upon movement of said control device towards said program means so that upon engagement of said ramp with said part the grid is caused to move out of the path of said lateral catches to release any of said fingers held in said second position, said pivotal member being free to rotate about its axis upon movement of said control device away from said program means, thereby to prevent actuation of said grid upon engagement of said part by said ramp, and a spring for returning said pivotal member into engagement with said stop and for returning said part in the path of said ramp after each pivotal displacement of said member by said grid.

4. Function control means as claimed in claim 2, wherein the plates of said program means are secured side to side.

5. Function control means as claimed in claim 2, wherein the plates initially have therealong an uninterrupted series of teeth, otiose teeth being subsequently removed.

6. Function control means as claimed in claim 2, wherein said fingers are arranged in a row disposed in a plane parallel to said plates, adjacent fingers in a row spanning a distance equivalent to a multiple of the pitch of two closely arranged teeth, said control device and said program means being movable, one relatively to the other, in a direction parallel to said row of fingers and capable of occupying a number of positions equal to said pitch multiple.

7. Function control means as claimed in claim 2, wherein said fingers are arranged in a plurality of parallel rows disposed in planes parallel to said plates, adjacent rows of fingers spanning several plates and adjacent fingers in a row spanning a distance equivalent to a multiple of the pitch of two closely arranged teeth, said control device and said program means being movable, one relatively to the other in a direction parallel to said plates and in a direction transversely of said plates.

8. Function control means as claimed in claim 2, wherein said spring means include a plurality of spring blades individually acting on said fingers at the ends thereof remote from said plates, said blades each constituting one component part of an electric switch.

References Cited in the file of this patent

UNITED STATES PATENTS

2,836,355	Banik	May 27, 1958
2,909,317	Dicke	Oct. 20, 1959
2,935,253	Chall	May 3, 1960