April 18, 1944. A. H. BUCKLEY 2,346,819

AUTOMATIC CONTROL MECHANISM FOR MOTORIZED TYPEWRITERS

Filed Aug. 7, 1941 3 Sheets-Sheet 1

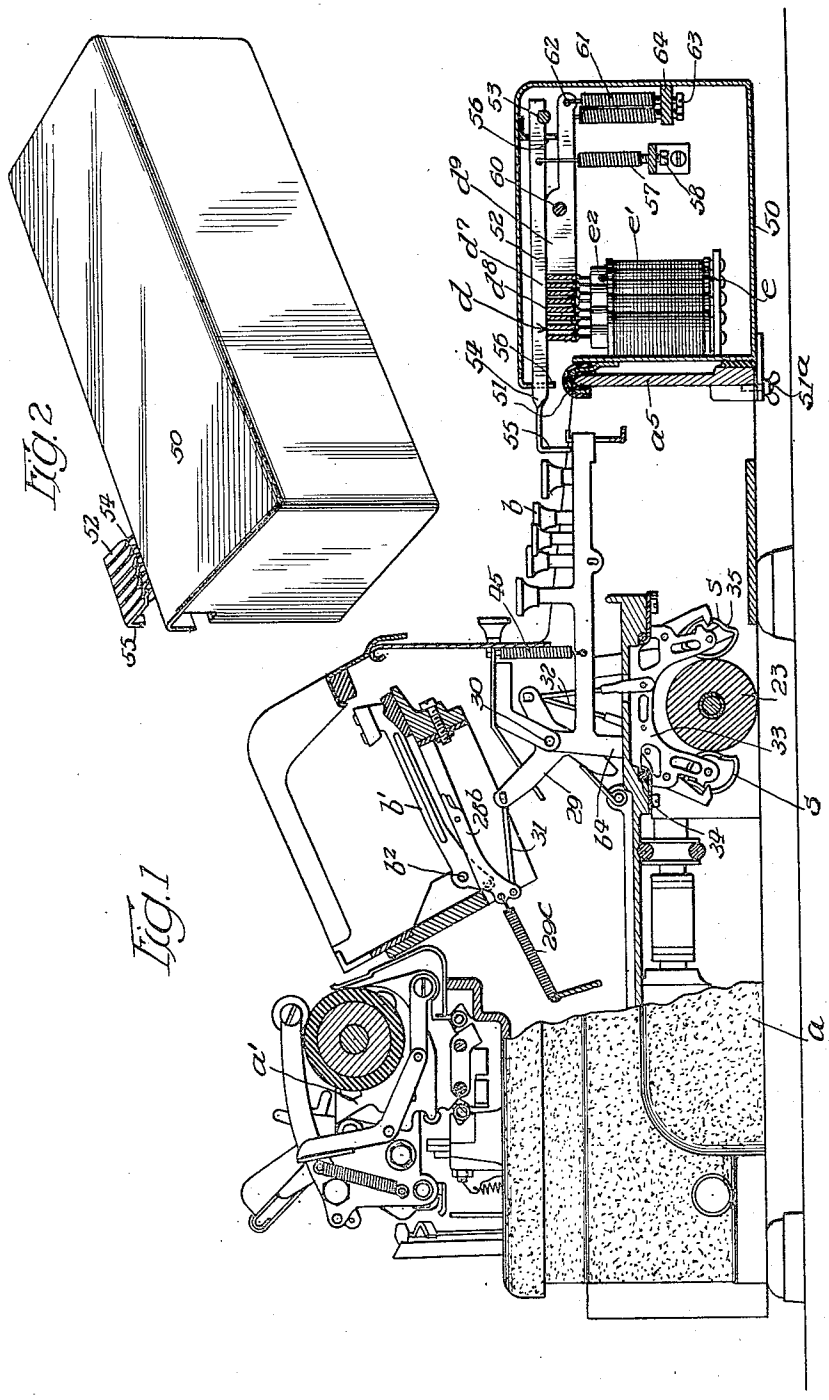


Fig. 2

Fig. 1

Inventor
Arthur H. Buckley
By Fred Gerlach
his Atty

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Filed Aug. 7, 1941 3 Sheets-Sheet 2

FIG. 3

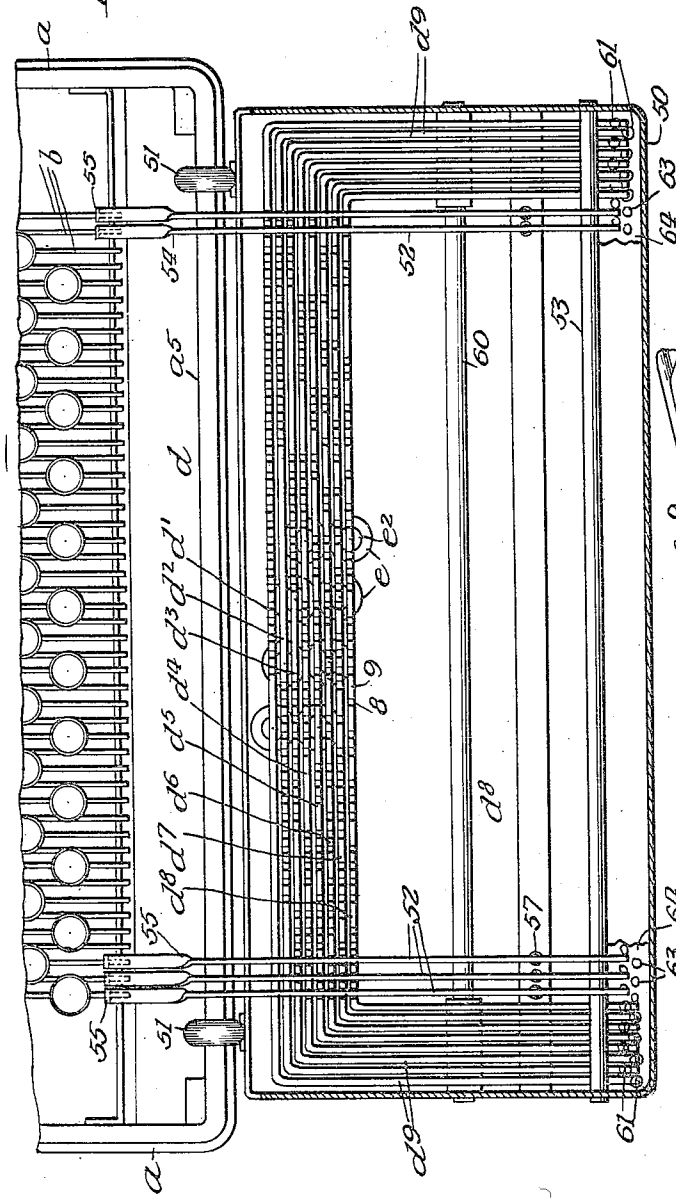
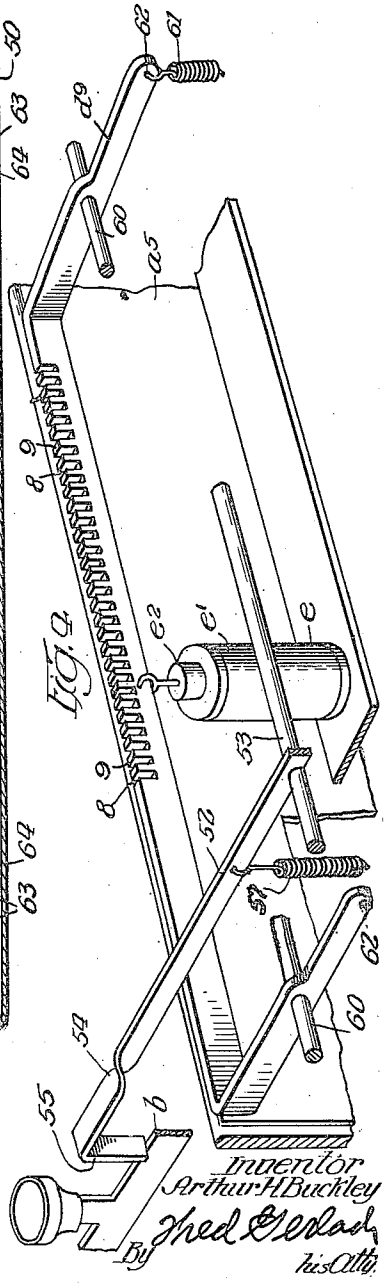


FIG. 4



Inventor
Arthur H. Buckley
By Fred G. Dash
his Atty.

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AUTOMATIC CONTROL MECHANISM FOR MOTORIZED TYPEWRITERS

Filed Aug. 7, 1941 3 Sheets-Sheet 3

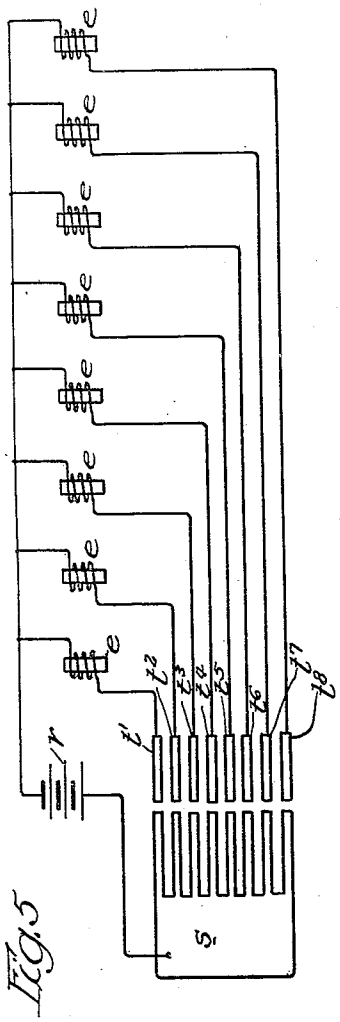


FIG. 5

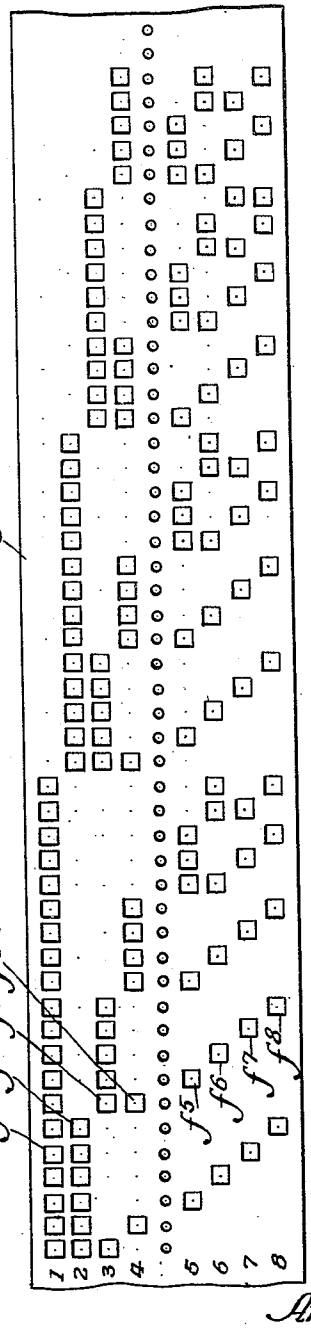


FIG. 6

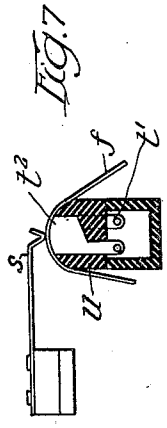


FIG. 7

Inventor
Arthur H. Buckley
By Fred Gerlach
His Atty.

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UNITED STATES PATENT OFFICE

2,346,819

AUTOMATIC CONTROL MECHANISM FOR MOTORIZED TYPEWRITERS

Arthur H. Buckley, Chicago, Ill.

Application August 7, 1941, Serial No. 405,738

7 Claims. (Cl. 197—20)

This invention relates to automatic motorized typewriters.

In automatic motorized typewriters the automatic controlling mechanism has usually been permanently connected to the keys or built into the typewriter. One object of the invention is to provide automatic control mechanism which may be connected to, and disconnected from, a motorized typewriter of standard construction. Such an attachment makes it possible to provide for automatic control of the typewriter-keys without reconstructing the typewriter or necessitating more or less permanent connections between the automatic control mechanism and keys.

Another object of the invention is to provide an improved attachment which comprises automatic controlling mechanism for a full set of keys and which may be attached to the front of a typewriter without interfering with the manual operation of the keys.

Another object of the invention is to provide simple automatic control mechanism for the keys of a motorized typewriter.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a view partly in side elevation and partly in section of a motorized typewriter and the automatic control mechanism mounted on the typewriter frame. Fig. 2 is a perspective of the automatic control attachment. Fig. 3 is a plan of a portion of the keyboard of a motorized typewriter and the attachment, the enclosing case for the attachment being shown in section. Fig. 4 is a skeletonized perspective of a portion of parts of the attachment and one of the typewriter keys. Fig. 5 is a diagram of the electrical connections for permutably operating the magnets in the automatic control mechanism. Fig. 6 is a view of a record-tape perforated to close the circuits through the permutably actuated magnets. Fig. 7 is a section of the tracker-bar and associated switches for controlling the magnets.

The invention is exemplified as applied to a motorized typewriting machine of usual construction which comprises a frame a, a full set of key-levers b for controlling the usual number of type-bars and associated actions, such as the spacing-mechanism, shift-lock, tabulator, back-spacer, case-shift and carriage return; type-bars b^1 controlled by the key-levers b; a drive-roll 23 which is driven by an electric motor (not shown) in any manner well understood in the art; a series of devices s each adapted to be coupled to, and uncoupled from, the roll 23 for individually shifting the type-bars b^1 or the associated actions by power from the roll; and a platen-carriage a^1, of any usual construction. These associated actions may be of any suitable construction, such as used in motorized typewriters. The devices s are alternately arranged at the front and rear of roll 23. Each shifting device s comprises a bell-crank lever 33 which is fulcrumed on a rod 34 which is fixedly supported in a member of frame 33. The horizontally extending arm of each lever 33 is adapted to shift a type-bar or action through a link 32 and a three-armed lever 29 which is fulcrumed on a rod 30. The vertically extending arm of each lever 33 carries at its lower end a rotatable element 35 which is provided with cam-faces which are normally disengaged from roll 23. Each key-lever b is provided with a depending arm b^4 which is adapted to control a latch for controlling the rotation of element 35 and shifting it into contact with the roll 23 for causing the element to be rotated a cycle of less than one-half revolution and automatically disengaging it, as well understood in the art. One arm of each lever 29 is connected by a link 31 to the rear end of a toggle lever 28^b which is adapted to shift the type-bar b^1 on its pivot b^2 by power derived from roll 23, or suitably connected to another action. A spring 29^c is applied to each lever 29 for retracting said lever and the lever 33 connected thereto. The details of the devices s and the connections for shifting them from key-levers b are more fully set forth in Letters Patent No. 2,247,275, granted to me June 24, 1941, to which reference may be had for the details thereof as the exemplification of motor operable devices for shifting the type-bars and other actions.

The attachment for adapting the motorized typewriter for automatic control is mounted in a case 50, which is provided at its inner side with a pair of hooks 51 which are adapted to fit over the usual front rail a^5 of the typewriter frame a and a screw 51a adapted to hold the hooks in firm engagement with the rail a^5. The case 50 is adapted to extend across the front of the typewriter-frame and contains the

automatic control mechanism for the keys *b*. This case is detachably connected to the rail a^5 and contains all of the automatic control mechanism for individually and selectively shifting all of the key-levers *b*, respectively. Each key-lever *b* is normally held in its raised position by a spring 45 of sufficient force to retract the key-lever when it is released.

The automatic control mechanism comprises a series of horizontally extending levers 52, one for operating each key *b*. The front ends of the entire series of levers 52 are pivoted on a rod 53 which extends across the front of the case 50. Each lever 52 is formed of a flat metal bar which is provided with a one-quarter twist 54 rearwardly of the rear of the case 50 so that its greatest width will extend transversely. At its rear end lever 52 is provided with a downturned terminal 55 which is adapted for abutting engagement with one of the keys *b*. Levers 52 are held in spaced relation by a comb-bar 56 on the case. Springs 57 are connected to levers 52, respectively, and have sufficient power to shift levers 52 to shift keys *b* against the force of springs 45 when the levers 52 are released. The lower ends of the springs 57 are connected to screws 58 whereby the tension of the springs may be accurately adjusted to function as aforesaid.

The control mechanism also comprises a series of eight bars *d* which are individually designated d^1, d^2, d^3, d^4, d^5, d^6, d^7 and d^8. The ends of these bars are provided with integral forwardly extending side-arms d^9 which are pivotally supported on a rod 60 which extends across and is secured in the end-walls of the case 50. The bars *d* are each normally pressed upwardly to engage one or more of the levers 52 by a spring 61, which is connected at 62 to the front end of arm d^9 and to an adjustable screw 63 which is threaded to a fixed bar 64. The force applied to the bars *d* by springs 61 preponderates the downward pull of springs 57 so that levers 52 which control the key-levers *b* will be normally held in their raised positions by said bars. The ends 55 of levers 52 are adapted to engage and depress, but are unattached to, the key-levers *b*, so the latter can be manually operated at any time independently of the automatic control mechanism.

Each of the bars *d* is shifted downwardly by a solenoid magnet *e* which comprises a helix e^1 and an armature e^2 which is connected by a link to a bar *d*. The magnets are mounted in the case 50 and are permutatively controlled in groups of three from any record-controlled mechanism. The magnets are controlled by a switch-mechanism *s*, which is adapted to individually close circuits through the magnets, respectively. These switches are associated with a tracker-bar *u* over which a tape *f* is advanced by any suitable tape-feeding mechanism, as well understood in the art. The tape or record comprises perforations f^1, f^2, f^3, f^4, f^5, f^6, f^7 and f^8 arranged in eight longitudinal lines of the tape. The perforations on each transverse line are located in groups of three for permutatively closing circuits through groups of three of the eight magnets *e*, as illustrated in Fig. 1, for the simultaneous operation of three bars *d*. Switch-mechanism *s* comprises a contact s^1 connected to a battery *r* and a series of contacts t^1, t^2, t^3, t^4, t^5, t^6, t^7 and t^8, which are connected, respectively, to magnets *e*, as illustrated in Fig. 5. As each transverse line of perforations in the tape passes over the tracker-bar, three circuits will be established for energizing three of the magnets *e*. The perforations in the tape are shown in accordance with the code exemplified in my application for Letters Patent filed April 24, 1939, Serial No. 269,658, now Patent No. 2,258,405, issued October 7, 1941, to automatically shift the controller-bars *d* in groups of three, which by different permutations individually control the full set of levers 52 for the keys *b* for the operation of type-bars and other actions of the typewriting machine by power. Each simultaneous closing of three circuits by the switch-mechanism *s* will pull down three bars *d* which are connected to the three actuated magnets against the force of springs 61. This exemplifies mechanism for automatically actuating magnets *e* in different three-group permutations for controlling the bars *d* from a record.

The upper edges of the controller-bars *d* are provided with notches 8 and abutments 9. These notches 8 and abutments 9 on the series of levers *d* are arranged so that each lever 52 will be held normally raised by the abutments 9 on a group of three bars and the remaining five of the bars are provided with notches 8 to permit the same lever to be lowered when the three of the magnets *e* which are connected to said group of three bars are actuated. The arrangement of abutments 9 on bars *d* is according to the code of perforations in the tape *f*, as illustrated in Fig. 6. Each lever 52 is normally held raised by the abutments 9 on three of the eight bars *d*. The remaining five bars are provided with notches 8 for each lever 52, so that each lever will be released when three bars are depressed. The levers are operated in different groups of three for each of the levers 52. As the result of the permutative operation of the eight magnets *e* and eight bars *d* in groups of three according to the code of the tape and this arrangement of abutments and notches, levers 52 will be singly released responsively to the different permutative operations of the bars *d* in groups of three. During the release of one lever 52 all of the other levers will be held raised by at least an abutment 9 on one of the levers *d* so that each operation of three of the bars *d* will singly release a lever 52. The released lever will operate a single key *b* responsively to the three-group perforations in the tape. The different permutative operations of eight bars *d* in groups of three are sufficient in number to control the individual operation of a set of levers 52 corresponding in number to the full set of keys *b* of the motorized typewriter, by springs 57.

When it is desired to provide a motorized typewriter of standard construction with automatic control mechanism, the case 50 will be attached to the front rail of the typewriter-frame so the rear ends 55 of levers 52 will be positioned to individually depress the keys *b*. This completes the necessary connections between the automatic control mechanism and the typewriter for the operation of the keys to control the shift of the type-bars and their actions by power from roll 23. The record-tape and its advancing mechanism may be located wherever desired. The switching devices controlled by the tape are connected by flexible conductors to the magnets *e* and may be located in any convenient place. When the case 50 has been attached to the typewriter-frame, the operation will be as follows: Normally, the levers 52 will be held raised against the force of springs 57 by three of the abutments 9 on three of the control-bars *d*. The keys *b* will be accessible for manual operation at all times independently of the automatic control mecha-

nism because levers 52 are adapted to abut and shift, but not connected to, the keys *b*. For automatic control of the motorized typewriter, the tape *f* is operated over the tracker-bar *u*. Each transversely arranged set of three perforations will close the circuits for three of the magnets *e*, which will depress three of the levers *d* which have abutments 9 engaging one lever 52, against the force of springs 61. The spring 57 connected to that lever will then depress it and operate one of the keys *b*. The permutative operation of the eight magnets *e* and interconnected bars *d* will be in accordance with the three-group perforations in the tape so that each of the levers 52 will be controlled by the tape-record. When the magnets are de-energized, springs 61 will raise the three depressed bars *d* and raise the lever 52, which has been depressed, to its normal position. By the permutative operation of the bars *d* in groups of three, the series of levers 52 for the entire set of keys *b* will be automatically and individually controlled. During each operation of a group of three bars *d* at least one abutment 9 will hold the remaining levers 52 raised.

An inherent characteristic of the invention is that the shifting levers of the automatic control mechanism are adapted to engage the key-levers in offset relation to the finger pieces which are used for manual operation, so that the latter remain free for independent manual operation at all times, and the rear ends of the shifting levers are adapted to be depressed independently of the operation of the automatic control mechanism.

The invention exemplifies an attachment which includes permutably operated elements or bars and which, when connected to the frame of the motorized typewriter, renders the typewriter automatically controllable. The attachment is comparatively simple so that the key may, when desired, be manually operated without disconnecting the attachment. The invention makes it possible to apply automatic control mechanism to a motorized typewriter of standard construction without change in the typewriting machine. The automatic control mechanism is simple in construction. When desired, this mechanism may be quickly detached from the typewriter-frame for any purpose.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. An attachment for a motorized typewriter, comprising a case provided with means for attachment to, and adapted to extend across, the front of the typewriter-frame, and automatic control mechanism for the typewriter-keys comprising a set of levers mounted in the case, pivotally supported at their front ends, and adapted to extend rearwardly over the front of the typewriter-frame to overlie and for individually shifting the key-levers of the typewriter, a series of permutably operable bars pivotally mounted in the case for selectively controlling the individual operation of the levers, means in the case for operating the levers to shift the key levers, the bars underlying the levers and being adapted to hold them in their normal position, means for shifting the bars to hold the levers in normal position, and means in the case for permutably operating the bars to control the individual operation of the levers.

2. An attachment for a motorized typewriter, comprising a case provided with means for attachment to, and adapted to extend across, the front of the typewriter-frame, and automatic control mechanism for the typewriter-keys comprising a set of levers mounted in the case, pivotally supported at their front ends, and adapted to extend rearwardly over the front of the typewriter-frame to overlie and for individually shifting the key-levers of the typewriter, a series of permutably operable bars pivotally mounted in the case for selectively controlling the individual operation of the levers, springs in the case for operating the levers to shift the key levers, the bars underlying the levers and being adapted to hold them in their normal position, means for shifting the bars to hold the levers in normal position, and means in the case for permutably operating the bars to control the individual operation of the levers.

3. An attachment for a motorized typewriter, comprising a case provided with means for attachment to, and adapted to extend across, the front of the typewriter-frame, and automatic control mechanism for the typewriter-keys, comprising a set of levers mounted in the case, pivotally supported at their front ends, and adapted to extend rearwardly over the front of the typewriter-frame to overlie and for individually shifting the key-levers of the typewriter, a series of permutably operable bars pivotally mounted in the case for selectively controlling the individual operation of the levers, springs in the case for operating the levers to shift the key levers, the bars underlying the levers and being adapted to hold them in their normal position, springs for shifting the bars to hold the levers in normal position, and means in the case for permutably operating the bars to control the individual operation of the levers.

4. The combination with a typewriter having a frame and keyboard, of automatic control mechanism therefor comprising a set of levers, means for supporting the levers across the front of the typewriter-frame, the levers being adapted to extend rearwardly over the front of said frame to overlie, and for individually shifting, the key-levers of the typewriter, springs for operating the levers to shift the key levers, a series of permutably operable bars adapted to hold the levers in their normal position and provided with means for selectively and individually controlling the operation of the levers by their springs, springs for shifting the bars to hold the levers in their normal positions, and means for permutably shifting the bars to control the individual operation of the levers.

5. The combination with a typewriter having a frame and a keyboard, of automatic control mechanism therefor comprising a set of levers, means for supporting the levers across the front of the typewriter-frame, the levers being adapted to extend rearwardly over the front of said frame to overlie, and for individually shifting, the key-levers of the typewriter, springs for operating the levers to shift the key-levers, a series of permutably operable bars adapted to hold the levers in their normal position and provided with means for selectively and individually controlling the operation of the levers by their springs, and permutably operable electromagnets for shifting the bars to control the individual operation of the levers.

6. An attachment for a motorized typewriter

having a frame and key-levers with finger pieces thereon for their manual operation, comprising a case adapted to extend across the front and outside of the typewriter frame, means for attaching the case to said frame, and automatic control mechanism for the key-levers comprising a set of levers for shifting the key-levers, respectively, mounted in the case, adapted to extend rearwardly therefrom over the front of the typewriter frame and provided with means at their rear ends terminating forwardly of the finger-pieces on all of the key-levers for individually engaging the key-levers in offset relation to the finger pieces so that the finger pieces will remain free for manual operation of the key-levers, springs for imparting operative strokes to the shifting levers, and mechanism for automatically and individually controlling the operation of the shifting levers by the springs for the selective and individual operation of the key-levers.

7. The combination with a typewriter and a frame and a set of key-levers having finger pieces for their manual operation, the key-levers being provided with extensions in the front and outside of the finger pieces, of automatic control mechanism for the key-levers comprising a set of levers for shifting the key-levers, means for supporting the shifting levers across the front of the frame, the shifting levers being provided with downturned rear ends terminating forwardly of the finger-pieces on all of the key-levers for engaging the front extensions on the key-levers, springs for imparting operative strokes to the shifting levers, and mechanism for automatically and individually controlling the operation of the shifting levers by the springs for the selective and individual operation of the key-levers.

ARTHUR H. BUCKLEY.