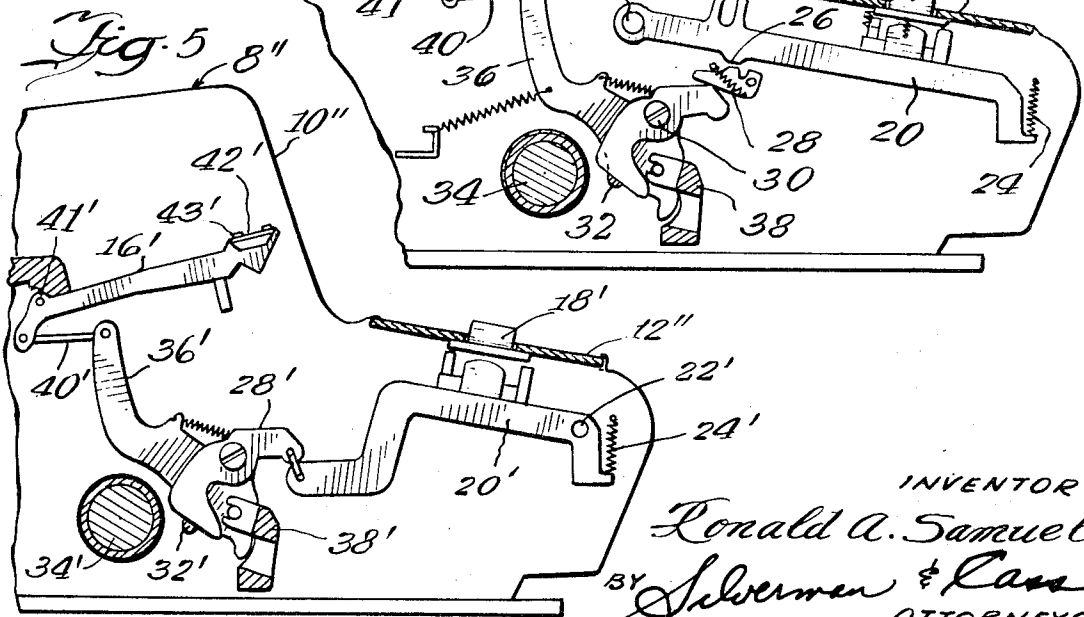
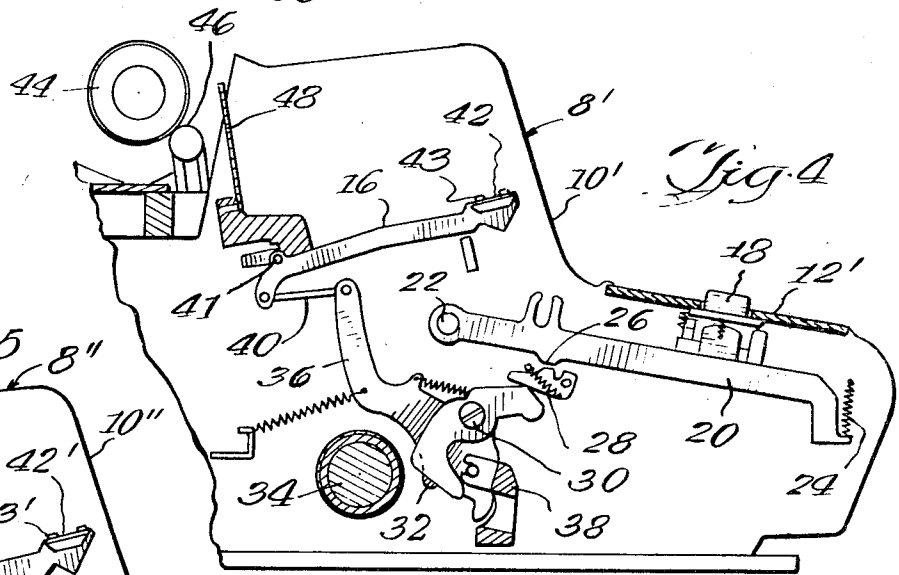
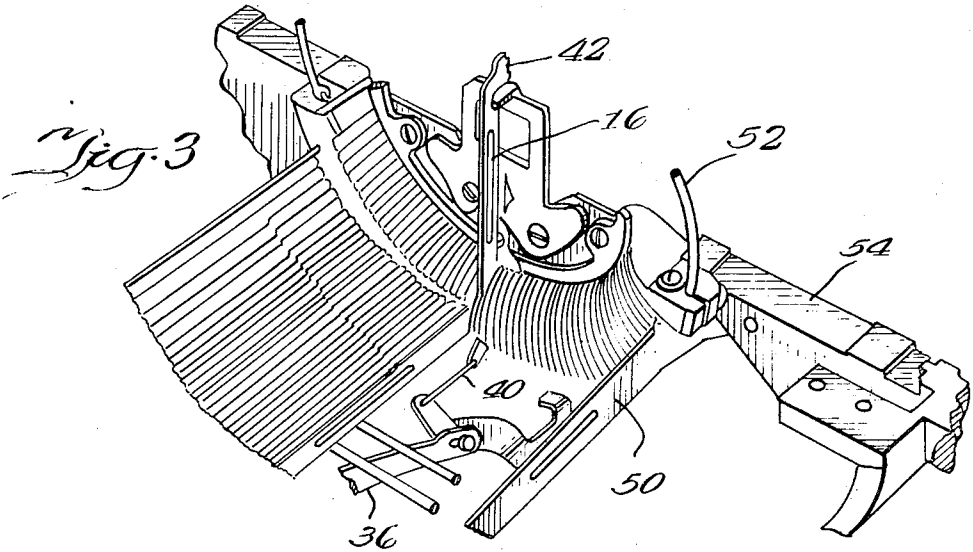
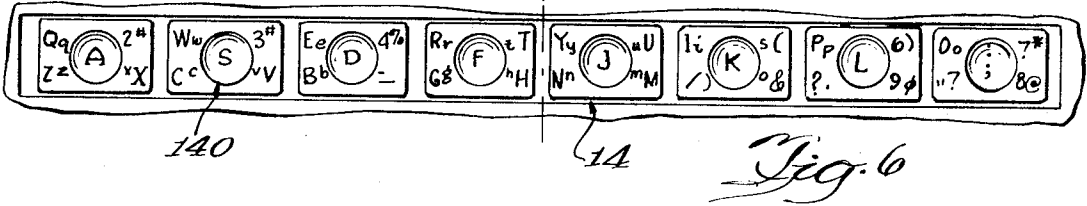


INVENTOR
Ronald A. Samuel
BY *Silverman & Cass*
ATTORNEYS



INVENTOR
Ronald A. Samuel
BY *Silverman & Cass*
ATTORNEYS

ELECTRIC TYPEWRITER KEY AND KEYBOARD ARRANGEMENT

BACKGROUND OF THE INVENTION

1 Field of the Invention

This invention relates generally to typewriter keys and keyboards and more particularly relates to a novel typewriter key and keyboard construction adapted for use with conventional electric or standard typewriters.

2 Description of the Prior Art

Standard typewriter keyboards consist of 40 or more keys arranged in four rows on the face of the typewriter housing. Operation of such standard typewriters usually is taught by instructing the typist to position the fingers of each hand above certain of the keys of the penultimate row on the keyboard, with each of the eight fingers of the typist's hands being positioned above one of eight keys. The typist has reduced to memory the positions of each respective key on the standard keyboard and, through practice and development of typing skills, will be able to move his fingers to the desired keys in any of the four rows, always returning his hands to "home" position above the penultimate row after finishing depression of the desired key.

Standard typewriter keyboards require that each finger of the typist's hands be responsible for the depression of four to eight keys located in each of the four rows. The distance a particular finger must move to his the desired key away from the "home" position is, in some cases, substantial and if the typist is not highly skilled, misprints, jamming and other errors can occur. It is not uncommon for even the most skilled typist to have to look away from the copy which is being duplicated on the typewriter and make sure that finger position is proper before proceeding in the typing operation.

Despite the drawbacks and inadequacies of standard typewriter keyboards, such keyboards are in wide use because no satisfactory means of changing the arrangement thereof without substantially altering the working components of the typewriter itself have been developed. Additionally, even though standard keyboards comprise a multiplicity of keys necessitating undesirable varied and extreme movement of a typist's hands in operation thereof, such keyboards are in universal use because any substantial change in the key arrangement would require completely revised teaching methods both for novice and experienced typists.

SUMMARY OF THE INVENTION

The invention is characterized by a plurality of substantially rectangular-shaped key members, each of which is positioned and retained on a respective key support member of approximately the same peripheral dimensions as the key member. Each key support member comprises four upstanding wall portions, each wall portion having an arcuate upper edge in face-to-face relationship with the bottom surface of its respective key member. Each key support member is disposed proximate five adjacent key levers of an electric typewriter, each key lever being provided with an upstanding key-lever-actuating post positioned at each corner, and the center of the key support member. The arrangement is such that each of the key members is pivotal on the arcuate upper edges of respective key support members to selectively depress one of the five upstanding, symmetrically arranged key-lever-actuating posts to actuate a desired type bar upon depressing or pivoting the proper key member above its respective key support member.

The primary object of the invention is to provide an electric typewriter keyboard having eight key members which are operable to actuate the forty type bars of a standard electric typewriter, thereby eliminating the undesirable need for a plurality of key members which necessitate vertical and diagonal movement of a typist's hands in the typewriting operation.

Another object of the invention is to provide such a typewriter keyboard which is adaptable for use with any standard typewriter without changing any of the operational components thereof except for said key members.

A still further object of the invention is to provide such a typewriter keyboard, the operation of which is easily taught to a typist using basic and established teaching methods with little variation therefrom.

The foregoing and other advantages of the invention will become apparent from the ensuing disclosure in which a preferred embodiment of the invention is described in detail and illustrated in the accompanying drawings. It is contemplated that minor variations in structural features and arrangement of parts thereof may appear to the skilled artisan without departing from the scope or sacrificing any of the advantages of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view of a standard electric typewriter, but with the standard typewriter keys removed therefrom and the keyboard of the invention replaced thereon.

FIG. 2 is an enlarged, exploded perspective view of two keys, and associated elements, of the typewriter keyboard of the invention.

FIG. 3 is a fragmentary perspective view of the segment and type bar arrangement of the standard electric typewriter illustrated in FIG. 1.

FIG. 4 is a fragmentary sectional view taken through the housing of one form of standard electric typewriter, with the keyboard of the invention illustrated assembled thereon.

FIG. 5 is a fragmentary sectional view taken through the housing of a second form of standard electric typewriter, with the keyboard of the invention illustrated assembled thereon.

FIG. 6 is a top plan view of the typewriter keyboard of the invention.

FIG. 7 is a fragmentary sectional view taken through one of the key members of the keyboard of FIG. 1, illustrating one key member of the invention in rest position. FIG. 8 is an enlarged view similar to that of FIG. 7, illustrating in solid line a key member of the invention in rest position and in dotted line in actuating position.

FIG. 9 is a fragmentary top plan view of one group of five key levers of a standard electric typewriter, with a key support member of the invention and the upstanding key-lever-actuating posts positioned thereon.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 there is illustrated one form of a standard electric typewriter, designated generally 8, including a housing 10 and a keyboard panel or dust cover 12 upon which all of the keys of the typewriter are mounted. All of the features of the typewriter 8 illustrated in FIG. 1, except for the keyboard designated generally 14, are standard. The keyboard 14 is of a construction which comprises the structure of the invention to be defined in detail hereinafter.

Looking at FIGS. 4 and 5, the working components of two types of standard electric typewriters are illustrated, one of which type is illustrated in FIG. 4 and the other in FIG. 5. The typewriter 8' shown in FIG. 4 has a housing 10', a keyboard cover 12' and a plurality of type bars, one such type bar 16 being illustrated. Actuation of the type bar 16 is accomplished by depressing key member 18 which in turn depresses key lever 20. The key lever 20 is pivoted about pivot point 22 at one end thereof and returned to the unactuated position illustrated by spring member 24 at the end opposite pivot point 22. Upon depression of key lever 20, surface 26 engages connecting linkage 28 which is pivoted about point 30 to engage cam member 32 against drive roller 34. Drive roller 34 is maintained in constant motion by a constant speed motor (not shown). When contact is made between cam 32 and drive roller 34, cam lever 36 is engaged against the drive roller 34 to be actuated thereby. Roller 34 moves cam lever 36 in a clockwise direction about cam lever carrier 38 which moves connecting rod 40 to actuate type bar 16 and swing the face 42 thereof in a counterclockwise direction. Type bar is is

pivoted about point 41 and typeface 42 engages the typing paper (not shown) held in place upon cylinder 44 by pressure roll 46. The type guide 48 guides type bar 16 such that typeface 42 having typewriting character 43 thereon engages the typewriting paper in proper alignment.

It should be understood that there is illustrated in FIG. 4 only one of a plurality of typing keys and associated parts and that in a standard typewriter there will be forty or more such keys, key levers, cam levers, type bars, etc., each key and associated parts being operative to actuate its respective typeface and imprint the desired character 43 on the typewriting paper.

In FIG. 5 there is illustrated a second form of standard electric typewriter 8'' in which the key lever 20' is pivoted proximate the middle thereof rather than at one end as in the typewriter 8'' illustrated in FIG. 4. Typewriter 8'' includes a plurality of key members and associated parts, one key member 18' being shown. A spring member 24' is provided to return key lever 20' to its rest position following movement thereof upon activation of key member 18'. Key lever 20' pivots about pivot point 22' to move connecting linkage 28' and engage cam 32' against drive roller 34'. Cam lever 36' thereby is moved in a clockwise direction, moving connecting rod 40' and in turn moving type bar 16' having typeface 42' and typewriting character 43'.

Certain of the elements illustrated in FIGS. 4 and 5 also are illustrated in FIG. 3 for purposes of clarity in describing the elements of standard electric typewriters with which the invention herein is concerned. These elements of a standard typewriter form no part of the invention claimed herein and are shown merely so that a complete understanding of the invention can be had. There is illustrated the typeface 42 of type bar 16, the same being in imprint position adjacent the typewriting paper (not shown). There also is shown a support arm 50 of the typewriter the fulcrum wire 52 and the segment portion 54. Also partially shown is cam lever 36, and connecting rod 40, in addition to other structural elements which are not necessary for a complete understanding of the invention.

Looking now at FIG. 2, two adjacent typewriter keys of the invention and associated parts are illustrated. The typewriter keys shown in FIG. 2 comprise only a portion of a total of eight such keys (FIGS. 1 and 6) which together form the keyboard of the invention. Each of the keys illustrated in FIG. 2 is identical in construction and only one such key 140 with associated elements therefore will be described in detail. It is to be understood that each of the remaining seven keys has corresponding structure to that described in connection with key 140.

In FIG. 2 there is shown five adjacent key levers, 60 through 68, of a standard electric typewriter, which key levers are operable to actuate five type bars connected respectively to their associated key levers. It is to be understood that the key levers 20, 20' of FIGS. 4 and 5 are representative of any one of the key levers 60-68 shown in FIG. 2.

Each key lever 60-68 of the standard typewriter will have an individual key member associated therewith through an upstanding key-lever-actuating member to effect operation of the respective typeface for the key lever. These elements of a standard typewriter have not been shown, but instead, the key levers are illustrated with individual key members and actuating posts removed which is the modification that would be performed in adapting a standard typewriter for use with the key and keyboard arrangement of the invention.

Upon removal of the individual key members and actuating posts which are standard equipment on the typewriters illustrated in FIGS. 4 and 5, each of five adjacent key levers, 60-68 will be fitted with the five upstanding key lever actuating posts, 80 through 88, of the invention. Disposed above the key levers 60-68, and in association with the actuating posts 80-88, is a key support member 90 which is of substantially square-shaped configuration and includes four upstanding wall portions 92, 94, 96 and 98. Each upstanding wall portion 92-98 is connected to its next adjacent wall portion by a

reduced-dimension member 100 of substantially L-shaped configuration, joining each respective wall portion normally to its next-adjacent portion. The upper edges 102 through 108 of the wall portions 92-98 are of substantially arcuate configuration and have positioned at the center thereof a respective upstanding spring member 110 through 116 retained by any suitable means such as weldment in a groove provided along the arcuate edge of each wall member.

The upstanding key-lever-actuating posts 80014 86 are arranged and positioned on their respective key levers 60-68 such that each post is positioned proximate one corner respectively of the key support member 90. The catercorner posts 80, 84, are identical in construction and comprise a planar, nondeformed metal member. Each catercorner post 82, 86 is of symmetrical configuration and comprises an upstanding portion 120, a second portion 122 deformed normally to the portion 120, a third portion 124 deformed normally to the portion 122, a fourth portion 126 of substantially L-shaped configuration and disposed normal to portion 124, and a last portion 128 which is disposed normal to the plane of portion 126 but lying in a plane parallel to the plane of portion 120. Post 86 is substantially similar in configuration to post 82 but comprises a mirror image of the latter. The upper extremities of each post 80-86 lie in the same plane which lies below the crest of arcuate edges 102-108 of wall portions 92-98.

A fifth upstanding key-lever-actuating post 88 is associated with each key support member 90 for actuation of key lever 64. Actuating post 88 comprises a substantially rectangular-shaped member having parallel sides 130, 132 and an arcuate edge 134 at the upper portion thereof. The crest of edge 134 lies slightly above the plane defined by the crests of arcuate edges 102-108 of wall portions 92-98.

Each respective key support member 90 and its associated key-actuating-lever posts has disposed thereabove a respective key member 140 of substantially square-shaped configuration having an upper surface 142 with suitable indicia provided at each corner thereof. Key member 14 could, if desired, be of polygonal or rectangular configuration. A central depression 148 is provided and the fifth indicia is etched in the center of the depression. A flange portion 150 of peripheral dimension greater than the key member 140 extends about all edges of the key member and is approximately the same in outer dimension as the outer dimensions of the key support members 90.

A dust or keyboard cover 12 with apertures 13 corresponding in number and size to each key member 140 is provided to overlie the said key members 140 such that the key members 140 extend through the apertures 13 and are retained therebelow by the flange 150. When each key member 140 is in place with dust cover 12 positioned thereabove, as illustrated in FIG. 1, the lower surface of flange 150 will abut the upper extremities of spring members 110-116, which in turn will bias the key members 140 in an upwardly direction so that flange 150 abuts the lower side of dust cover 12, as best seen in FIG. 7.

Each key member 140 is operable to actuate key lever post 88 by depressing key member 140, thereby asserting pressure upon central depression 148 to depress key lever 64. Depression of key lever 64 will operate the type bar associated therewith to impress a desired character on the typewriting paper. The remaining four key-lever-actuating posts 80-86 are actuated by pivoting key member 140 on the arcuate upper edges of support member 90 to depress any individual one of said key-lever-actuating posts, and its associated key levers to impress the desired typewriting character on the paper. Since the crest of each edge 134 lies slightly above the plane defined by the crests of the arcuate edges 102-108 of wall portions 92-98, depression of any of the actuating posts 80-86 will not result in concurrent depression and actuation of key-lever-actuating post 88. Conversely, depression of key-lever actuating post 88 will not result in actuation of any of the actuating posts 80-86 because the crest of edge 134 of key-lever-actuating post 88 and the upper extremities of each post

80-86 lie in different planes. Furthermore, since edge 134 of the keylever-actuating post 88 is arcuate in shape, flange 150 of key member 140 is free to move axially and pivotally on the arcuate edges 102-108 of key support member 90, such that simultaneous depression and actuation of more than one key-lever-actuation post is not possible. Indicia on the face of each key member 140 at each corner and the center thereof, as best seen in FIG. 6, designate which key lever will be actuated upon pivoting or depressing the key member.

Looking at FIG. 8, key member 140 is shown in solid-line position at rest, and in dotted-line position being pivoted upon upper arcuate edge 106 of upstanding wall portion 96 to depress key-lever-actuating post 86 and thereby actuate key lever 66. Upon release of pressure, spring members 112 and 114 will force key member 140 to return to its rest position illustrated in solid line. In like manner each of the respective upstanding key-lever-actuating posts can be depressed by exerting pressure on the central depression or each corner of key member 140 to actuate the desired key lever and imprint a desired typeface on the typewriting paper, thereby effecting performance of the typewriting operation. The various movements of key 140 are illustrated schematically in FIG. 9.

The keyboard arrangement illustrated in FIG. 1 is such that 40 characters can be actuated using the eight fingers of a typist's hands. Using the shift lever of a common standard typewriter, the number of available characters is doubled so that 80 characters can be actuated. In many instances, standard typewriters are provided with more than 80 typewriting characters including, in addition to alphabetical characters, certain nonstandard-type characters such as a question mark, a plus or equal sign, or fractional symbols. Where it is desired to adapt such a typewriter to use with the invention, the keys for these additional typewriting characters can be left on the typewriter keyboard for individual use when needed, and will be complementary to the eight keys of the invention.

It should be noted that, since the invention greatly reduces the space occupied by conventional keyboards, room is now available for a row of numbers either above or below the main keyboard. The spatial economy thus afforded by the main keyboard of the invention makes feasible the heretofore unprecedented combination of a typewriter and adding machine, a most flexible business machine. Similarly, the spatial economy afforded by the invention makes possible many other specific combinations of machines, all of which combinations yield increasing functional versatility.

In adapting the standard typewriter for use with the invention, it is necessary only to remove the key-lever-actuating posts provided with the standard typewriter, and to modify the keyboard or dust cover to have properly located apertures for receipt of the key members of the invention. The key-lever-actuating posts of the invention can be welded or otherwise secured to the key levers of a standard typewriter and the eight key support members 90 can easily be positioned above each of the five respective key levers to completely transform a standard typewriter into one utilizing the improved typewriter keyboard of the invention.

Although not specifically illustrated, the invention may be implemented in a nonelectrical or manual typewriter.

What is desired to secure by Letters Patent and what is claimed is:

1. A keyboard for an electrical typewriter including a plurality of key levers for actuating a like number of type bars having characters of indicia on the faces thereof, said keyboard comprising, a plurality of substantially polygonal-shaped key support members overlying said key levers, each key support member being positioned next adjacent another in lineal orientation one with each other each key support member overlying one set respectively of five adjacent key levers, each key lever having an upstanding key-lever-actuating post affixed thereto, each set of key levers including five actuating posts, four of said posts being disposed respectively adjacent each corner of each said support member and a fifth post disposed proximate the center of each said support

member, a plurality of key members corresponding in number to said key support members, means to movably retain said key members above each respective key support member in contact with said actuating posts, and means to bias said key members out of contact with said actuating posts whereby said key members can be depressed selectively to actuate each of said key-lever-actuating posts to effect the typewriting operation.

2. A keyboard as defined in claim 1 in which said key support members are eight in number.

3. A keyboard as defined in claim 1 in which each key support member comprises four upstanding wall portions, each wall portion being joined to the next adjacent wall portion by a reduced-dimension member, and each wall portion having a substantially arcuate-shaped upper edge.

4. A keyboard as defined in claim 3 in which said means to bias said key members comprise an upstanding spring member retained on the upper edge of each said wall portion proximate the center thereof.

5. A keyboard as defined in claim 1 in which each said key member is of substantially polygonal-shaped configuration having a peripheral flange extending about the lower edge thereof, said flange being of substantially the same outer dimension as that of each said key support member, and a keyboard cover having apertures corresponding in number and disposition with said key members, said cover being disposed over said key members such that each said key member extends through said apertures and is retained therein by said peripheral flange.

6. A keyboard as defined in claim 5 in which each key support member comprises four upstanding wall portions, each said wall portion having a substantially arcuate-shaped upper edge, and said means to bias said key members comprise an upstanding spring member retained on the upper edge of each said wall portion proximate the center thereof, the upper extremities of said spring members lying in a common plane which is coincidental with the lower surface of said flange.

7. A keyboard as defined in claim 6 in which each said key member is operable selectively to depress any one of said four posts disposed adjacent each corner of said support member by pivoting said key member on the arcuate upper edges of said wall portions.

8. A keyboard as defined in claim 6 in which the upper extremities of each said key-lever-actuating post lie in a common plane below the plane defined by the crests of the arcuate edges of said upstanding wall portions.

9. A keyboard as defined in claim 8 in which there are two sets of catercornered posts disposed adjacent each corner of said support member, each post of the first set comprising a planar nondeformed member, each post of the second set being a mirror image of the other and comprising a first upstanding portion affixed to a respective actuating lever, a second portion deformed normal to said first portion, a third upstanding portion deformed normal to said second portion, a fourth substantially L-shaped portion deformed normal to said third portion, and a fifth upstanding portion disposed normal to said fourth portion but lying in a plane parallel to the plane of said first portion.

10. A keyboard as defined in claim 8 in which said fifth post is of substantially rectangular configuration with parallel side edges and an arcuate-shaped upper edge joining said side edges.

11. An electric typewriter key construction for actuating a set of five adjacent typewriter key levers and associated type bars having characters of indicia on the faces thereof, said key construction comprising, a polygonal-shaped key support member adapted to be mounted overlying said set of key levers, each key lever having an upstanding key-lever-actuating post affixed thereto, four of said posts being disposed respectively adjacent each corner of said support member and a fifth post disposed proximate the center of said support member, a key member, means to movably retain said key member above said key support member in contact with said

actuating posts, and means to bias said key member out of contact with said actuating posts whereby said key member can be depressed selectively to actuate each of said key-lever-actuating posts to effect the typewriting operation.

12. A key construction as defined in claim 11 in which said key support member comprises four upstanding wall portions, each wall portion being joined to the next adjacent wall portion by a reduced-dimension member, and each wall portion having a substantially arcuate-shaped upper edge.

13. A key construction as defined in claim 12 in which said means to bias said key member comprise an upstanding spring member retained on the upper edge of each said wall portion proximate the center thereof.

14. A key construction as defined in claim 11 in which said key support member comprises four upstanding wall portions, each said wall portion having a substantially arcuate-shaped upper edge, and said means to bias said key member comprise an upstanding spring member retained on the upper edge of

each said wall portion proximate the center thereof.

15. A Key construction as defined in claim 11 in which there are two sets of catercornered posts disposed adjacent each corner of said support member, each post of the first set comprising a planer nondeformed member, each post of the second set being a mirror image of the other and comprising a first upstanding portion affixed to a respective actuating lever, a second portion deformed normal to said first portion, a third upstanding portion deformed normal to said second portion, a fourth substantially L-shaped portion deformed normal to said third portion, and a fifth upstanding portion disposed normal to said fourth portion but lying in a plane parallel to the plane of said first portion.

16. A key construction as defined in claim 15 in which said fifth post is of substantially rectangular configuration with parallel side edges and an arcuate-shaped upper edge joining said side edges.

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