

Aug. 19, 1952

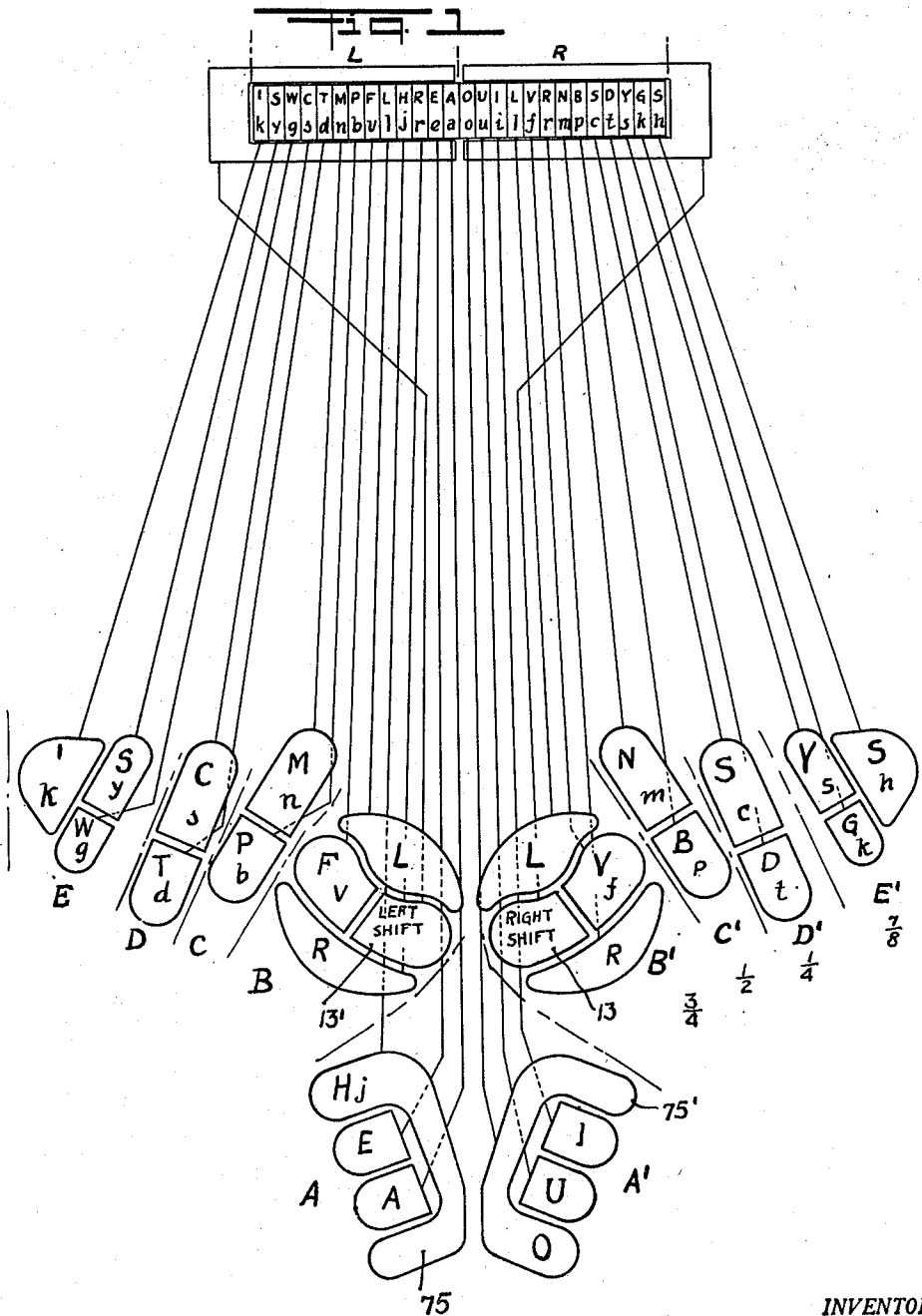
M. REED ET AL

2,607,464

STENOGRAPHIC TYPEWRITING MACHINE

Filed April 1, 1948

3 Sheets-Sheet 1



INVENTORS
Mildred Reed and
Franklin H. Bickford
BY Mock & Blum
ATTORNEYS

Aug. 19, 1952

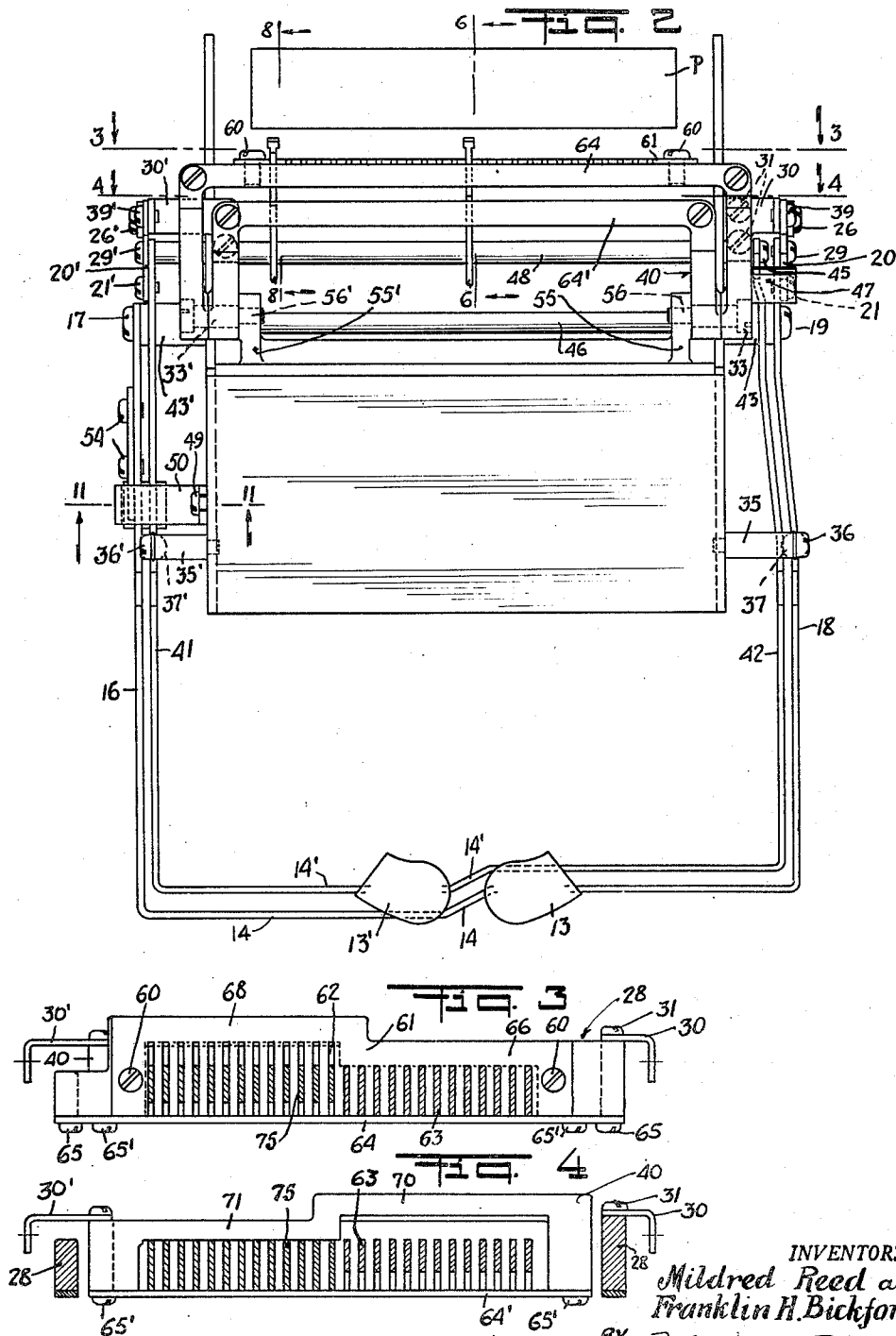
M. REED ET AL

2,607,464

STENOGRAPHIC TYPEWRITING MACHINE

Filed April 1, 1948

3 Sheets-Sheet 2

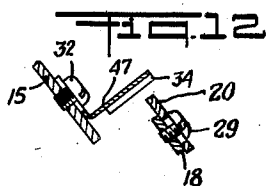


INVENTORS
Mildred Reed and
Franklin H. Bickford
BY Mock & Blum
ATTORNEYS

M. REED ET AL

STENOGRAPHIC TYPEWRITING MACHINE

3 Sheets-Sheet 3



INVENTORS
Mildred Reed and
Franklin H. Bickford
BY Mock & Blum
ATTORNEYS

UNITED STATES PATENT OFFICE

2,607,464

STENOGRAPHIC TYPEWRITING MACHINE

Mildred Reed, Bellows Falls, Vt., and Franklin H.
Bickford, Liverpool, N. Y.

Application April 1, 1948, Serial No. 18,354

7 Claims. (Cl. 197—9)

1

This invention relates to improvements in typewriting machines and more particularly to stenographic or short-hand typewriting machines.

Of the several types of stenographic typewriting machines evidenced in the prior art, nearly all are designed to operate generally upon the same principle of imprinting a word or group of words at a single stroke, wherever possible. Such an operation is achieved by constructing the stenographic machine so that a plurality of type faces simultaneously strike the paper through the ribbon when the corresponding keys are depressed by the fingers of one or both hands at the same time. With each stroke, the line spacer is automatically actuated, the result being that each succeeding word is written directly beneath the previous word. In lengthy or multi-syllabic words, it is often necessary to devote one stroke to a syllable, some words requiring two or three strokes to be written.

The previously known types of stenographic machine, while achieving a highly desirable rapidity in writing by the operation described above, are nevertheless subject to several serious objections. The most serious difficulty has been the necessity of employing a code or shorthand system in imprinting the recorded matter, making it impossible for a person not trained in such code to operate the machine. The necessity for using a code was brought about for the following reason: It is imperative that stenographic machine operators transcribe the spoken word at a highly rapid rate; hence it is essential to limit the movement of the hands and fingers to the smallest area possible. Since the number of keys which can possibly be included in the keyboard is necessarily limited by the anatomical structure of the hand, it follows that the maximum speed and ease of operation can be effected by diminishing the number of keys as far as is practicable.

This object of reducing the size of the keyboard is hampered by the necessity for a sufficient number of type faces, arranged in such an order that any given combination of consonants and vowels forming a word may be imprinted by a minimum number of strokes. In the stenographic machines heretofore designed, a solution of this problem was sought in the use of either a standard shorthand system or a special code devised for the particular machine.

Obviously, each said expedient is subject to a further disadvantage. Not only is the written matter produced illegible so far as a person untutored in the special code or in a shorthand system is concerned, but further, an operator is required to memorize a code in addition to being schooled in the operation of the machine.

It is one object of this invention, therefore, to provide a shorthand typewriting machine which will enable an operator to type at a rela-

2

tively rapid rate, and at the same time, will produce typed matter which is legible and readable by any literate person.

A second object of the invention is the provision of a shorthand typewriting machine in which the keyboard contains a minimum number of keys, and yet which will enable the operator to transcribe most common one-syllable words with one stroke of the respective keys.

A third object of the invention is to provide a shorthand typewriting machine which can be operated by a person having no knowledge of shorthand or a special code.

A fourth object of the invention is to provide a shorthand typewriting machine which will type entire words, at one stroke, either in their normal form, or in easily recognizable common English abbreviations.

A fifth object of the invention is the provision of a machine for shorthand typewriting in which the keyboard is designed to facilitate the most effective movement of each finger, especially to enable the outer fingers of each hand to be located in their most natural operative positions.

A sixth object of the invention is to provide a machine of this type which has two shifter yokes, which are operated independently of each other by the left hand and the right hand.

Fig. 1 is a schematic plan view showing the keyboard arrangement and the relation between the keys thereof and the type faces;

Fig. 2 is a top plan view of the shift mechanism, shown partly in section, all of the keyboard keys and levers except the two shift keys and shift levers being omitted for simplicity in illustration;

Fig. 3 is a side elevation of the outer shifter yoke in inverted position, as taken through line 3—3 of Fig. 2;

Fig. 4 is a side elevation of the inner shifter yoke in inverted position, as taken through line 4—4 of Fig. 2;

Fig. 5 is a side section of the shift mechanism showing the right side of said shift mechanism with the corresponding shift key, and the frame broken away at certain sections thereof;

Fig. 6 is a sectional view of the shifter yokes and type bar taken through line 6—6 of Fig. 2;

Fig. 7 is a view similar to Fig. 6, with the outer shifter yoke shown in shifted position;

Fig. 8 is a sectional view of the shifter yokes in neutral position, as taken through line 8—8 of Fig. 2;

Fig. 9 is a view similar to Fig. 8, with the inner shifter yoke shown in shifted position;

Fig. 10 is a sectional view of the torsion tie bars of the machine, taken through line 10—10 of Fig. 5;

Fig. 11 is a sectional view of the left-hand adjustable shifter stop, taken through line 11—11 of Fig. 2; and

Fig. 12 is a sectional view of the right-hand

adjustable shifter stop, taken through line 12—12 of Fig. 5.

In order to achieve a degree of legibility never before attained in a stenographic machine without sacrificing either speed of operation or keyboard compactness, it has been necessary to devise improvements in the shift mechanism as well as in arrangement of the keyboard and the shape of keys. As the following explanation will show, the latter improvement would have been impossible but for the former, while the improved shift mechanism would have been valueless unless a novel keyboard had been devised.

The improved machine has a series of type bars. As shown in Fig. 1, each type bar has an upper character and a lower character. These type bars are controlled by shift mechanism, the upper type faces being located in operating position when the corresponding shift key is not depressed; while the lower type face is located in operative position when the corresponding shift key is depressed. When one character of a type bar is in typing or operative position, the other character of the same type bar is in non-typing or non-operating position.

For convenience, one character on each type bar is designated as its "raised" character, which is typed when the type bar is operated while said type bar is in shifted or raised position. The other character in the respective type bar is designated as its "neutral" character, which is typed when the type bar is operated in unshifted or neutral position.

Figs. 2 and 5 illustrate a preferred embodiment of the divided or multiple shift mechanism, the function of which is to allow one section of type bars to be located in raised or shifted position, in order to type their respective "raised" characters, while maintaining the other type bars in their neutral positions. Two shift keys 13, 13', are located at opposite sides of the center of the keyboard, or more specifically, referring to Fig. 1, at the center of the inward portion of each index finger group B, B'.

Each respective shift key 13, 13' is attached to a respective shift-lever 14 and 14'. The left-hand shift lever 14' has arms 41 and 42. The right-hand shift-lever 14 has arms 16 and 18.

The left shift-lever 14' is located rearwardly of right shift lever 14, and the arms 41 and 42 are located intermediate the arms 16 and 18.

Each shift lever 14 and 14' can be depressed independently of the other shift lever.

Arm 16 is secured to one end of rod 46 by clamping screw 17, while the other end of said rod is secured to arm 18 by clamping screw 19. Rod 46 is rotatably mounted adjacent its two ends in extensions 43, 43' of frame 15, as shown in Fig. 10. It will thus be seen that arms 16 and 18 are adapted to pivot relative to frame 15.

Arm 41 is connected pivotally to extension 43' of frame 15 by the aforesaid clamping screw 19, said screw acting in this instance as a pivot member. Similarly, arm 42 is pivotally connected to extension 43 of the frame of the machine; clamping screw 19 acting as a pivot member for said arm 42. Thus, arm 41 is adapted to rotate with relation to frame 15 independently of arm 16.

As shown in Fig. 5, the arm 18 is fixed, rearwardly of its pivot 19, to a bar 20, by means of clamping screws 21 and 29. The shank of clamping screw 29 extends through a slot of bar

20, so that bar 20 can be fixed adjustably to arm 18.

The bar 20 is pivotally connected at 23 to a link 22. Link 22 is located at one side of an inner link 24. Clamping screws 26 and 25 releasably fix link 22 to link 24. By means of a slot 27 in link 22, the connection between links 22 and 24 is adjustable. Link 24 is pivotally connected at 39 to the angular arm 39 of rear shifter yoke 28. The arm 30 is fixed by screws 31 to the rear shifter yoke 28.

As shown in Figs. 5 and 12, a stop 47 is fixed adjustably by clamping screw 32 to the inner frame 15 of the machine, in order to limit the downward movement of shift key 13. The lower face of stop 47 is provided with a pad or cushion 34 of soft material, said cushion being located to engage the upper face of bar 20 when shift key 13 is depressed.

As shown in Figs. 2 and 5, the rear shifter yoke 28 is pivotally connected at 33' and 33 to upstanding lugs of the inner frame 15 of the machine. Hence, when the shift key 13 is depressed, the rear shifter yoke 28 is tilted upwardly.

As shown in Fig. 2, a lateral rod 35 is fixed to the inner frame 15 of the machine. As shown in Fig. 5, the upper end of a tension spring 37 is fixed to rod 35 by a screw 36. The lower end of tension spring 37 is connected at 38 to arm 18. The shift key 13 is thus held yieldably in its upper position shown in Fig. 5. In said position of shift key 13, the rear yoke 28 is in its neutral position.

One of the features of the improved machine is a front shifter yoke 40. The conventional machine of this type has only one shifter yoke.

The front shifter yoke 40 is operated by the left shift key 13'. The mechanism for actuating the front shifter yoke 40 by left shift key 13' is substantially as previously described. The parts which are associated with left shift key 13' and front yoke 40, have prime reference numerals which correspond to the respective reference numerals previously stated.

The differences in structure will be presently described.

As previously mentioned, the shift lever 14' is provided with a left arm 41, and a right arm 42. As shown in Figs. 2 and 10, left arm 41 is pivotally connected to extension 43' of frame 15 by pivot member 17, adjacent its rear end. Said rear end of arm 41 is located rearwardly of pivot member 17, and is connected to a bar 20' by screws 21' and 29'. Bar 20' is connected to the front shifter yoke 40, in the manner previously described. Thus, depressing left shift key 13' will upwardly tilt the front shifter yoke 40.

It will be observed that rear shifter yoke 28 is actuated only by arm 18 of shift lever 14 and the intermediate mechanism. Since left arm 16 of shift lever 14 is pivotally attached directly to frame 15 without being directly connected to rear yoke 28, it is evident that the greatest part of the resulting stress is applied to right arm 18, especially at its pivot point 19. To diminish this stress and distribute it equally over both arms 16 and 18 of shift lever 14, torsion tie-bar 46 is provided, as best illustrated in Fig. 10. This tie bar connects the pivot points 17 and 19 of said shift lever 14, said tie bar being rotatably inserted through extension members 43, 43' of frame 15.

Similarly, to equalize the stress on left arm 41 of inner shift lever 14', torsion tie bar 48 is

5

provided, connecting the terminal ends of said inner shift lever 14', by bolts 29' and 45.

Attached to the left side of frame 15, by screw 49, a stop bar 50 is provided to limit the downward movement of arms 41 and 16 of shift levers 14' and 14 respectively. The lower horizontal arm 51 of stop bar 50 is provided with a pad or cushion 52. Arm 53 is releasably secured to left arm 16 of outer shift lever 14 by means of bolts 54, said arm 53 having a vertical slot in the center thereof, which enables said arm to be vertically adjusted, thus regulating the downward movement of arm 41 and ultimately the position in which lower type faces 67' strike platen P.

As shown in Fig. 2, shifter yokes 28 and 40 are U-shaped, and are located adjacent each other, inner shifter yoke 40 being of smaller dimension and fitting within the U-shaped inner recess of outer shifter yoke 28. Both shifter yokes are independently pivotally secured to extension arms 55, 55' of frame 15 at both terminal ends thereof by means of bolts 33, 33' which are threaded only at their terminal ends 56, 56' and thus secured to extension arms 55, 55'.

Attached along the outer lateral edge of shifter yoke 28 by means of screws 60, 60 is comb plate 61, comprising a series of slots 62 open at the upper end, each of which said slots encases one type bar 63 or 75 as illustrated in Figs. 3 and 4. The slots 62 provide a free sliding fit on the side of said type bars for lateral spacing. A guide plate 64 is laterally attached to the upper end of shifter yoke 28 by means of bolts 65, 65, in order to provide an upper vertical retainer or stop for the type bars.

The right lower wall 66 of shifter yoke 28 is stepped upwardly with the following effect: When said shifter yoke is pivoted upwardly, the type bars on the outer right hand section R of the machine are engaged by the upper surface of the right lower wall 66 of shifter yoke 28, and are pivoted upwardly, thus bringing lower type faces 67 of this section into position to strike the platen P. The remaining type bars comprising section L slide vertically downward through slots 62, and since inner lower wall 68 of shifter yoke 28 is stepped downward with relation to outer lower wall 66, the type bars are not engaged by said lower wall, and are not pivoted upward.

As shown in Figs. 2 and 4, inner shifter yoke 40 located anteriorly to shifter yoke 28 is similar in construction to said shifter yoke 28, except that it has an upwardly stepped left lower wall 71, and a downwardly stepped right lower wall 70 and is placed in the machine in reverse position. When pivoted upwardly, this inner yoke 40 will engage and raise the type bars 75 of the left hand section L, without affecting the remaining type bars 63. In neutral position, neither shift key being depressed, the type bars are vertically restrained between the guide plates 64, 64', and the upper surface of the high step of each plate, the type bars passing through the grooves 62 of comb plate 61.

As shown in Figs. 6 and 8, the type bars 63 comprising those located on the right hand side or section R, are shaped differently from type bars 75 comprising those located in section L on the left hand side. Thus, both sets of type bars are cut away on their upper surfaces to enable said type bars to clear the opposing guide plates when shifted, as shown in Figs. 7 and 9.

As was previously stated, each of the type bars of the machine bears two type faces in vertical

6

relation to each other, the lower face 67 of which is placed in printing position by depressing the corresponding shift key. The divided-shift mechanism allows shifting of the keys on one side of the keyboard, for instance those on the right-hand side, while those on the opposing, or left-hand side remain in an unshifted or neutral position. Fig. 1 shows the arrangement of the type faces, section L being composed of type faces which are shifted by operation of the left shift key, while section R is composed of type faces which are shifted by operation of the right shift key. It will be noted that the vowel type-bars bear the same letters on the top and bottom faces thereof, so that operation of either shift key will not vary the characters typed thereby. This embodiment is illustrated to simplify description of the shift mechanism. In the preferred embodiment of the invention, however, the type bars may be divided into three sections, the right and left end sections thereof being capable of being shifted by right and left shift keys respectively, while the center section which contains the vowel type bars may be stationary and unaffected by operation of either shift key. To accomplish this effect, the shifter yokes are so constructed that their upper edges do not coincide at the center, but the downwardly stepped portion of each shifter yoke is extended far enough to enable either shift key to be depressed without actuating the vowel type bars.

In the drawings, the type bars are arbitrarily illustrated as comprising capital letters on the upper type face and lower case letters on the lower type face thereof. Thus in the drawings and description, lower-case letters are used to indicate that the corresponding type is in the raised or shifted position. Hence, by way of illustration, if the word "trot" is referred to, it will be written "TRot" indicating that the left-hand section of type bars was in un-shifted or neutral position while the right-hand section, containing the letters "ot" was shifted or in raised position.

The lower characters of the type faces are shown as lower-case solely for convenience and simplification in illustrating the invention. In the preferred embodiment of the invention, however, the type faces are to consist of capital letters only, resulting in every letter being produced as a capital whether shifted or neutral.

It will be observed that the arrangement of keys and type, combined with the divided-shift, enables a very large combination of letters to be produced at one stroke. All of the common consonants are located on the right-hand as well as on the left-hand side of the keyboard, with the vowels being located in the center. The operator of the machine, being able to shift either side of the keyboard while maintaining the opposite side in its neutral position, can thus reproduce a wide variety of words at a single stroke which was impossible with previously known shorthand typewriting machines and keyboards. The following letters are capable of being written to open a word, that is, to be typed previous to the intermediate or ending consonants:

A B C D E F G H I J K L M N O P R S T U V W Y

For the letter "Q" the letter "k" may be substituted, while for the letters "X" and "Z," the letters "S" and "s" may be respectively substituted. To close or end a word, the following letters are capable of being produced:

A B C D E F G H I K L M N O P R S T U V Y

7

Again, a substitute for the letters "W," "X" and "Z" may be legibly supplied by use of the following letters respectively: "U," "S" and "s."

The following illustration is given to clearly reveal the invention in operation. To type the phrase "Four score and seven years ago our fathers brought forth on this continent a new nation . . .," the first word "Four" is produced by depressing the F key with the index finger on the left hand. At the same time, the right thumb depresses the O and U keys simultaneously by pressing at the juncture between the two keys, and the first or index finger of the right hand depresses the R key. For this word, it is unnecessary to depress either shift key.

To type the word "forth," the left index finger depresses the F key, the entire left section of the keyboard being left in the unshifted or neutral position. Simultaneously, on the right hand, the thumb depresses the O key, while the index finger depresses both the shift key and R key, and the third or ring-finger depresses the t key and the little finger the h key. The word is thus typed as "Forth."

The phrase, therefore, when typed on this keyboard, would read as follows:

	F	OU	R
S C		O	R
	A	N D	
S	E	V N	
y	ea	R S	
g	O		
	OU	R	
F	A		
T	H E	R S	
b	r	o	t
F	o	r	th
	O	N	
T	H	I	S
C	O	N	
T		I	N
n			t
	A		
n	U		
n	a		
S	H	U	N

It is impossible to write such multi-syllabic words as "father," "continent" and "nation" in one stroke on the keyboard, hence such words are written in separate syllables. However, the syllables are still read from left to right, and are capable of being understood by a person untrained in shorthand or in the operation of the machine. Words like "new" and "seven" which have to be abbreviated, are written "nu" and "sevn" respectively, and are still easily recognizable.

The keyboard shown in Fig. 1 is arranged in ten sections, the keys of each section being intended to be operated by a single specific finger. Sections A, B, C, D and E are to be operated by the thumb, index finger, middle finger, ring finger and little finger respectively. The keyboard is principally arranged in a mirrored pattern, in other words, the opposing keys on each side of the keyboard generally contain the same letters, except that the character produced on one side when in an unshifted or neutral position would

8

be the same as the letter produced by the corresponding key on the other side when in the shifted position, and vice-versa. For instance, the letter M on the left-hand side of the keyboard is produced by striking the top key of group C with the left middle finger, the left side of the keyboard being in an unshifted position. To produce the letter m on the right hand side of the keyboard, the middle finger of the right hand is used to depress the opposite corresponding key, the top key in group C', while the right hand side of the keyboard is in a shifted position. This mirror-effect enables the operator of the machine to learn the location of the keys on the keyboard quickly and easily, since most of the letters have the same position on both sides of the keyboard and are operated by the same finger on each hand.

In Fig. 1, the index-finger groups B, B' are shown arranged in a quasi-circular form, the keys being so shaped that the top and bottom key is adjacent to the two middle keys, while the middle keys are adjacent to every other key in the group. The keys in these two groups B, B', are to be operated by the index finger of each hand, said finger being that digit which is possessed of the greatest amount of flexibility of any of the fingers. The arrangement of the keys of these groups combined with the flexibility of the index finger, enables the shift key on each side of the keyboard to be depressed by the index finger together with any of the other keys in the quasi-circular groups. There is also made possible the reproduction of seven combinations of characters on either side of the keyboard, with a single stroke of the index finger. For example, on the right hand quasi-circular group B' a single stroke of the index finger can produce the following combinations: L—V, l—shift—f, l—shift, V—R, f—shift, f—shift—r, and r—shift. Similarly, on the left quasi-circular group B the following combinations can be produced: F—L, l—shift, v—shift—l, v—shift, r—shift, v—shift—r, and F—R. This arrangement makes possible the inscription of such words as "SELF" and "ofr" with a single stroke.

The vowel keys are located at the center of the keyboard as is conventional in a machine of this sort. This arrangement is essential since the opening consonants must be on the left, the vowels in the middle and the closing consonants on the right, in order to type English words. To enable the production of a greater number of combinations of vowels, two U-shaped extension arms 75, 75' are provided on either side of the keyboard. In thumb-group A, on the left-hand side, the extension arm 75 is attached to the top key, or H-key and runs downwardly to below and adjacent the A-key. Extension arm 75 may be operated independently of the other keys in group A. Thus by striking the A-key and the lower member of extension arm 75 at the same time, the combination HA or in shift position ja, is typed, in addition to the possibility of producing the neutral HE or shifted je and EA. On the right hand side, the extension arm 75' is attached to the O key, and extends upwardly, the upper member thereof being adjacent to the I key. This construction permits simultaneous depressing of the O key, through the extension 75', and of the I key, thus allowing each of the diphthongs or combinations OU, UI, and OI to be printed at a single stroke. If desired, an extension arm may be provided to be attached to the R keys in groups B, B' and extend to adjacent the

L keys of the same groups, thus enabling such words as "COLR," etc. to be typed at a single stroke.

To indicate the omission of an unaccented vowel at the beginning of a word, the type bar on the far left contains an apostrophe on its upper type face. The corresponding key is located on the far left of the keyboard and is operable by the little finger of the left hand. The apostrophe, when written, represents any vowel which may open or commence a word; thus "around" is written "ROUND"; "afford" written "FORD," etc.

As shown in Fig. 1, no one finger of either hand is required to strike more than three different keys at any time. Certain fingers of the hand, i. e. the ring finger and middle finger, are of such an anatomical construction that they are incapable of flexibility of movement in either a vertical or horizontal direction while the rest of the fingers are rigidly outstretched. To compensate for this horizontal inflexibility, the third or ring finger, and the second or middle finger are each required to operate only two keys, while the thumb and index finger which have the greatest degree of flexibility are provided with four keys apiece for operation.

To obviate the difficulty of moving certain fingers independently while the remainder of the digits are held motionless, it was necessary to place the keys in a stepped position. Starting with the thumb keys, or groups A, A', as the basic level, the index-finger groups B, B' are located approximately three-quarters of an inch above the aforementioned groups; the middle-finger groups C, C' one-half inch above the thumb groups, the ring-finger groups D, D' one-quarter inch thereabove, and the little-finger groups E, E', seven-eighths of an inch thereabove. When the fingers rest upon their designated finger groups, it will thus be seen that the hand is placed in an arched position, which position is the most natural and relaxed for movement of the fingers. In short, the second and third fingers are enabled to move more freely when the hand is held in the aforementioned position with said fingers lower than the index finger. The stepped arrangement of keys serves a still further function. When the hands are placed upon the keyboard, the relative vertical positions of the fingers indicate whether the fingers are resting upon the proper finger groups.

The thumb groups A, A' which contain the vowel keys are arranged on the keyboard at an angle to the horizontal arrangement of the other key groups. When the hands are placed in their operating position, therefore, the thumbs can conveniently contact any of the three vowel keys, said keys being located in an arc through which the thumbs can naturally travel.

While several preferred and modified forms of this invention have been shown and described, it is obvious that numerous changes, omissions and substitutions may be made in this invention, especially in the arrangement of the letters of the keyboard, without departing from the spirit and scope thereof.

We claim:

1. In a shorthand or stenographic typewriter machine having a keyboard at the front end thereof, a pair of opposed shift keys located on either side of said keyboard, a row of horizontally disposed type bars divided into a plurality of sections, each of said type bars bearing an upper and a lower type face, a pair of U-shaped

shift levers pivotally mounted in said machine, each of said shift levers having a transversely extending front arm connected to one of said shift keys, and a pair of spaced side arms extending longitudinally and rearwardly in said machine from said front arm, each of said shift levers being horizontally spaced from the other, and being pivotally mounted within said machine so that depression of its respective shift key will cause the free, rear ends of the side arms to move upwardly, and a shifter yoke intermediately connected to the free ends of the side arms of each shift lever, each shifter yoke having a transversely-extending arm located directly beneath all of said type bars, a portion of said arm being stepped upwardly, said stepped portion being positioned to engage and raise one of said type bar sections to a point at which the lower type faces of said section are in printing position when the corresponding shift key is depressed.

2. In a shorthand or stenographic typewriting machine having a platen and a keyboard with a pair of opposed shift keys located at either side thereof, a row of horizontally disposed type bars divided into a plurality of sections and each having an upper and a lower type face, a pair of spaced shifter yokes pivotally connected to the frame of said machine and being independently intermediately actuated by one of said shift keys, and a comb plate affixed to each shifter yoke, each of said comb plates having a series of spaced vertical slots, one of said type bars being slidably housed in each of said slots, each of said shifter yokes having a transversely-extending arm located beneath all of said type bars, said arm having an upwardly-stepped portion, said stepped portion being positioned to engage and pivotally raise one of said type bar sections to a point at which the lower type faces of said section are in printing position, when the shifter yoke is actuated.

3. A shorthand or stenographic typewriting machine having a horizontally disposed row of type bars and a keyboard with a pair of opposed shift keys located on either side thereof, each of said shift keys being adapted to shift a section of type bars while leaving the remaining sections unaffected, said keyboard being composed of a plurality of keys, the vowel keys thereof being located at the center of said keyboard, and the consonant keys at either side of said vowel keys, the consonant keys on each side of the keyboard being adapted to produce all of the common consonants, the majority of consonant keys on one side bearing the same letters in shifted position as the consonant keys in opposed relation thereto on the other side bear in unshifted position, the respective corresponding fingers of each hand being generally adapted to produce the same consonant letters.

4. A shorthand or stenographic typewriting machine having a keyboard composed of a plurality of keys, the keys being arranged in distinct integral groups having a horizontal relation to each other, the thumb groups being located adjacent the front end of the keyboard and in the center thereof, the index-finger groups being located to the rear of said thumb groups, and the middle, ring, and little finger groups being located on either side of said index-finger groups, said finger groups being arranged in arcs beginning with the central thumb groups and extending rearwardly and toward the sides of said keyboard, said arcs corresponding to the natural position of the fingertips when the respective

hand is held with the thumb centered on the thumb group and the hand in a normal and relaxed arched position, each of said groups being so located as to be centered directly under a separate finger in said arched position of the hand, each of said groups containing a selected number of keys arranged in a pattern corresponding to the effective relaxed sphere of movement of the corresponding finger when the fingers of the respective arched hand are held centered upon their respective groups, the keys constituting said groups being positioned sufficiently proximate to each other so that all adjacent keys in each group may be depressed simultaneously by the respective finger, the index-finger groups being composed of four keys arranged in circular configuration, the posterior and anterior key of each of said groups extending the length of the two center keys thereof, and being adjacent one edge of both of said center keys, the center keys being adjacent each other at the inner facing edges thereof.

5. A shorthand or stenographic typewriting machine having a keyboard composed of a plurality of keys, the keys being arranged in distinct integral groups having a horizontal relation to each other, the thumb groups being located adjacent the front end of the keyboard and in the center thereof, the index-finger groups being located to the rear of said thumb groups, and the middle, ring, and little finger groups being located on either side of said index-finger groups, said finger groups being arranged in arcs beginning with the central thumb groups and extending rearwardly and toward the sides of said keyboard, said arcs corresponding to the natural position of the fingertips when the respective hand is held with the thumb centered on the thumb group and the hand in a normal and relaxed arched position, each of said groups being so located as to be centered directly under a separate finger in said arched position of the hand, each of said groups containing a selected number of keys arranged in a pattern corresponding to the effective relaxed sphere of movement of the corresponding finger when the fingers of the respective arched hand are held centered upon their respective groups, the keys constituting said groups being positioned sufficiently proximate to each other so that all adjacent keys in each group may be depressed simultaneously by the respective finger, the index-finger groups being composed of four keys arranged in circular configuration, the posterior and anterior key of each of said groups extending the length of the two center keys thereof, and being adjacent one edge of both of said center keys, the center keys being adjacent each other at the inner facing edges thereof, the center key adjacent the center of the keyboard being the shift key.

6. A shorthand or stenographic typewriting machine having a horizontally disposed row of type bars and a keyboard composed of a plurality of keys, each of said keys being intermediately connected to one of said type bars and adapted to actuate said type bar, the keys being arranged in distinct integral groups having a horizontal relation to each other, the thumb groups being located adjacent the front end of the keyboard and in the center thereof, the index-finger groups being located to the rear of said thumb groups, and the middle, ring, and little finger groups being located on either side of said index-finger groups, said finger groups being arranged in arcs beginning with the central thumb groups and extending rearwardly and toward

the sides of said keyboard, said arcs corresponding to the natural position of the fingertips when the respective hand is held with the thumb centered on the thumb group and the hand in a normal and relaxed arched position, each of said groups being so located as to be centered directly under a separate finger in said arched position of the hand, each of said groups containing a selected number of keys arranged in a pattern corresponding to the effective relaxed sphere of movement of the corresponding finger when the fingers of the respective arched hand are held centered upon their respective groups, the keys constituting said groups being positioned sufficiently proximate to each other so that all adjacent keys in each group may be depressed simultaneously by the respective finger, the thumb group thereof consisting of three primary keys arranged in a row, said row extending toward the rear of said keyboard and slanting toward the adjacent side of the keyboard as it extends rearwardly, the angle at which said key row slants being such as to conform to the sphere of movement of the thumb when the hand is held in its arched position, and a U-shaped extension member securely attached at one arm to the key at one end of the row, the other arm thereof terminating adjacent the key at the opposite end of the row.

7. A shorthand or stenographic typewriting machine having a horizontally disposed row of type bars and a keyboard with a pair of opposed shift keys located on either side thereof, each of said shift keys being adapted to shift a section of type bars while leaving the remaining sections unaffected, said keyboard being composed of a plurality of keys, the vowel keys thereof being located at the center of said keyboard, and the consonant keys at either side of said vowel keys, the consonant keys on each side of the keyboard being adapted to produce all the common consonants; the majority of consonant keys on one side bearing the same letters in shifted position as the consonant keys in opposed relation thereto on the other side bear in unshifted position, the respective corresponding fingers of each hand being generally adapted to produce the same consonant letters, said keys being arranged in distinct integral groups, each group being arranged to correspond with a separate finger of the hand, the keys of each group being sufficiently proximate to each other to permit each key in the group to be depressed simultaneously with at least one other key in the group by the single corresponding finger.

MILDRED REED.

FRANKLIN H. BICKFORD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,222,748	Edwards et al.	Apr. 17, 1917
1,280,977	Ebelhare et al.	Oct. 8, 1918
1,843,929	Parker	Feb. 9, 1932
2,189,023	Ayres	Feb. 6, 1940
2,318,519	Palanque	May 4, 1943

FOREIGN PATENTS

Number	Country	Date
13,609	Great Britain	of 1905
422,549	France	of 1911
549,498	France	of 1922