

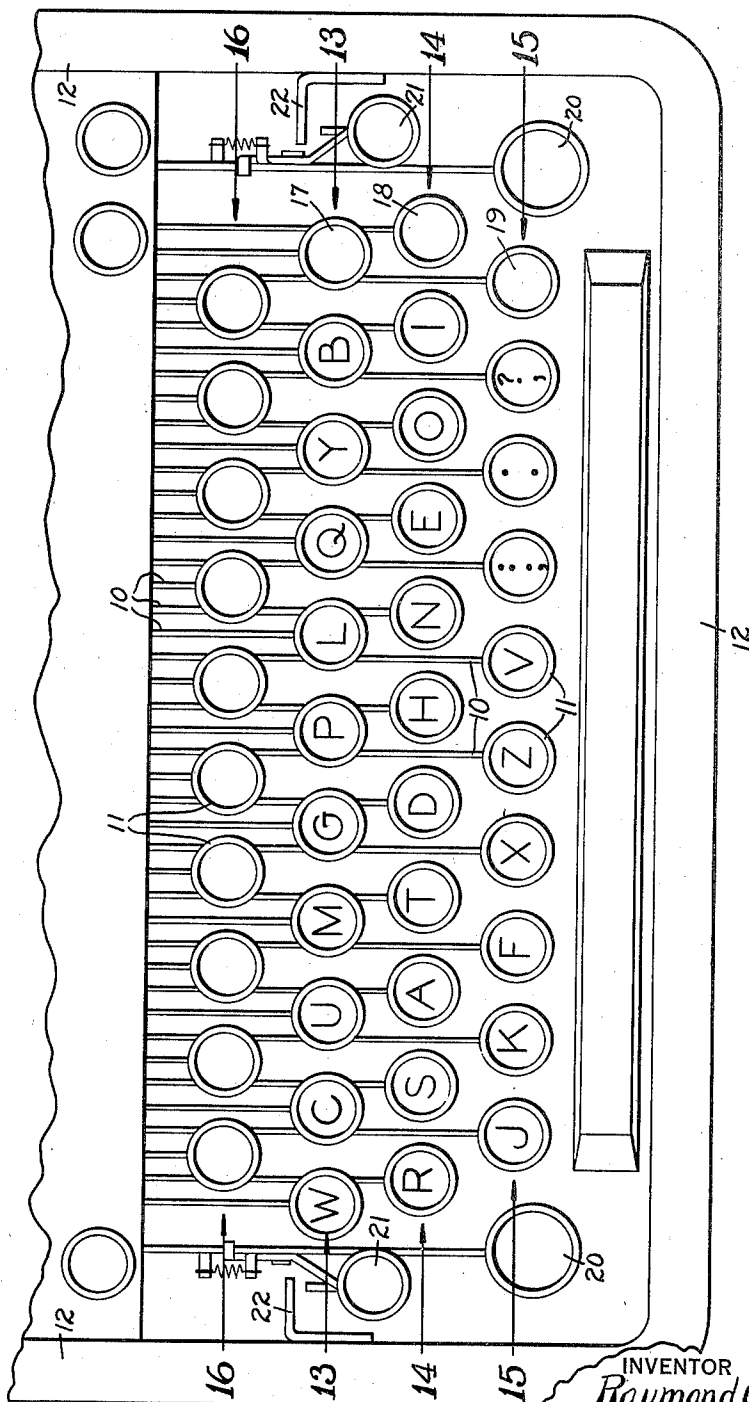
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KEYBOARD FOR TYPEWRITERS

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KEYBOARD FOR TYPEWRITERS

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This invention relates to a typewriter and it has to do more particularly with a keyboard therefor.

It has been found by recognized frequency count that the letters E, T, A, I, O, N, R, S, H, and D of the alphabet, of importance in the order named, constitute approximately 70 per cent of the letters used in writing the English language. In the present standard keyboard, the keys representing the foregoing letters are so arranged that, under approved touch methods of typing, the work done in the normal hand and finger positions without reaching for another key or into another key bank is approximately 25 per cent, with the left hand doing approximately about four times the amount of work done by the right hand. The majority of operators are right-handed and in most instances typewriter carriages are returned and line spaced by the left hand. Consequently, with the standard keyboard, the most work is imposed on the weaker and less dexterous hand and fingers which reduces the ease and speed of operation.

Typewriter keyboards are usually arranged so that there are three horizontal banks or rows of letter keys which are segregated laterally into diagonal rows according to approved touch methods of typing. These diagonal rows include keys operated by a single finger. In the present standard keyboard, the middle key bank or row is the normal guide row and only four of the more important letter keys A, S, D and H are located in this normal hand position. It will be seen, therefore, that, in the present standard keyboard, it is necessary to reach in order to operate the keys representing the important letters E, R, T, I, O and N which represent more work than the other important keys in the middle or normal hand position bank. For mechanical reasons and due to finger positions of the touch method, the finger reaches between certain keys vary. For example, on the present standard keyboard, the distance between J and Y operated by the index finger of the right hand is greater than K and I operated by the middle finger of that hand; and in all diagonal rows of keys, or those operated by the same finger under the touch method, the reach from the middle row key to the upper key is less than the reach from the middle row key to the lower one. This necessity for reaching with the standard keyboard arrangement requires considerable hand movement on the part of the operator and such movement coupled with the awkwardness of some of the finger reaches naturally slows up the work of the operator and

requires great skill for combined speed and accuracy in typing.

It has also been found by recognized frequency count that the more important two-letter combinations used in writing the English language are, in the order named, ER, TH, EH, IN, IT, ES, EN, ON, OR, ED, AT, OF, AR, AN, ST, OT, ET, IS, AL, EL and NG, in the letter sequence stated or vice versa. In writing all these combinations with the present standard keyboard, except AL, the operator is required to reach from one key bank to another thereby requiring increased skill for efficient and speedy operation.

Another factor in reducing speed of operation in the present standard keyboard is the necessity of striking succeeding important keys with the same finger. Such a condition exists in the present standard keyboard, for example, in writing ED. In this case, finger reach is necessary by the same finger thereby making the operation slower than when different fingers are used because, in the latter case, one finger is striking while the other is moving into position to strike the succeeding key.

Still further, in the present standard keyboard, and according to approved touch methods of typing, the "A" and colon keys at the opposite ends of the center key bank serve as guide positions, the operator finding the proper key positions on the keyboard from these keys which are operated by the left and right little fingers, respectively. With this arrangement, the letter A, third in frequency importance, is operated by the least dexterous finger on the less dexterous hand which tends to further reduce speed, ease and accuracy in operation.

It is known that type bar "collision", which is caused by two type bars engaging each other as they move to and from printing position, is a factor having to do with the speed that may be attained in the operation of a typewriter. The higher the point of collision, or the nearer to the printing point it takes place, the more rapidly the keys may be struck and, hence, the greater the speed in printing. Also, the greater the lateral distance between successive key operations, the nearer the collision point is to the printing point. It has been found that in writing certain important two-letter combinations with the present standard keyboard, the point of "collision" is quite low or remote from the printing point since the successively operated keys are closely adjacent to each other in lateral direction. This adds another limit to the speed of opera-

tion of a typewriter with the present standard keyboard.

The principal object of this invention is to provide an improved keyboard for a typewriter and by which all of the foregoing objectionable features are practically eliminated.

Another object is to provide an improved keyboard which is adapted to be operated according to the finger positions of approved touch systems and by which increased typing speed is attained with greater ease in operation and with less skill.

A further object is to provide a keyboard having a plurality of banks of keys wherein the greater amount of work done is concentrated in normal finger or guide positions in one bank of keys thereby reducing finger movement to the minimum; and the work is distributed between the right and left hands and fingers in proportion to frequency of occurrence of the letters in writing the English language and also according to the strength and dexterity of the hands and fingers whereby the right hand does more work than the left hand and the work done by the fingers decreases somewhat uniformly from the index to the little finger.

An additional object is to lessen the occurrence of type collision.

Other objects and advantages will appear as this description progresses and by reference to the drawing which is a plan view of one form of keyboard embodying this invention.

It is to be understood that this invention has utility in various forms of typewriters. Merely for the purposes of this description, it will be understood that the keyboard illustrated is well suited for a typewriter including a traveling paper carriage, a case-shiftable platen and type bar mechanism including a plurality of type bars supported by an arcuate-shaped type bar segment for swinging movement toward and from the platen.

The type bars are actuated by depressible key levers 10 connected to the type bars by cranks (not shown). Keys 11 are mounted at the forward or keyboard ends of the key levers 10 for the depression of the latter to move the type bars to the printing point.

According to this invention, and as illustrated in the drawing, the keyboard is defined by a frame member 12 and the keys 11 are arranged in horizontal rows or banks. Some of these keys actuate type bars for printing letters of the alphabet and others actuate type bars for printing numerals and other characters.

The letter keys are arranged in three rows 13, 14 and 15, which will be referred to, respectively, herein as the upper, middle and lower rows or banks. The top row or bank of keys 16 may be employed for numerals or other characters and this is likewise true of the right end keys 17, 18 and 19 of the upper, middle and lower banks. The right- and left-hand keys 20 are used for case shifting purposes and may be connected to the case shift mechanism (not shown) in any suitable manner. The right- and left-hand keys 21 are case shift lock keys which cooperate with the frame carried members 22 for locking the case shift mechanism in case shifted position.

The middle key bank 14 which is in the normal hand position, includes the more important letters used in writing the English language and these letters are arranged according to frequency of occurrence so that the keys representing the same will be actuated by fingers of the right and

left hands according to the strength and dexterity of the latter. More particularly, I arranged the middle bank of keys to include, reading from left to right of the drawing, the letter keys R, S, A, T, D, H, N, E, O and I. In this arrangement I employ the letters R, S, A and T in four guide positions for the left hand and the letters N, E, O and I in four guide positions for the right hand, whereby most of the work is concentrated in eight finger or guide positions wherein reaching of hand or finger shift is not required.

The upper key bank 13, where less reach is required as compared to the lower key bank 15, includes the keys which are of next importance; and in the lower key bank 15, which is more difficult to reach, I place the keys which are of least importance. More particularly, the upper key bank includes, from left to right, the letter keys W, C, U, M, G, P, L, Q, Y and B, while the lower key bank includes, from left to right, the letter keys J, K, F, X, Z, V and the keys for printing the semicolon, period, question mark, etc.

According to approved touch methods of typing, the keys to be struck by the same finger of the same hand are arranged in diagonal rows laterally of the keyboard as, for example, the letter keys J, R and W. Reading from left to right of the drawing, the first three diagonal rows are adapted to be operated by the little, third and middle fingers of the left hand respectively, while the next two diagonal rows are adapted to be operated by the index finger of the left hand. The succeeding two diagonal rows are adapted to be operated by the index finger of the right hand the remaining three rows by the middle, third and little fingers of the right hand, respectively.

Several advantages are attained in the use of a keyboard embodying my invention. Each key is located in a definite position relative to the hands and fingers of the operator so that the keys most frequently used are the ones in the most convenient positions to be depressed thereby eliminating unnecessary hand movement. The more important letter keys, or the keys which are used most frequently in writing the English language, are disposed in the middle key bank or row whereby most of the work is done in the normal hand position without reaching. In fact, it has been found that, in the use of this invention, approximately 61% (28% left hand and 33% right hand) of the work may be done in the eight guide positions of the middle key bank, and approximately 70% of the work may be done without movement of the fingers from the middle bank. Reach will be required by the fingers into the upper key bank 13 in doing approximately 20% of the work and only about 10% of the work will require reaching into the lower bank 15; whereas with the present standard keyboard 49% of the work will require reaching into the upper key bank and 19% into the lower key bank.

Still further, in the use of this invention, the left hand will do somewhat less work than the right hand, with the index fingers of both hands doing more work than the other fingers of the respective hands. Also, the work done by the middle, third and little fingers of both hands will do proportionately decreasing work; whereby, the work to be done is not only arranged according to frequency count but also according to the dexterity of both the hands and the fingers. For example, it is found by frequency count that about 47% of the work will be done by the left hand

and 53% by the right hand with the index finger of the left hand doing approximately 16% of the work, the left middle finger 13%, the left third finger 10% and the left little finger 3%, the right index finger 18%, the right middle finger 15%, the right third finger 11%, and the right little finger 9%. On the other hand, in the present standard keyboard, about 55% of the work is done by the left hand and 45% by the right without the work being divided among the fingers according to strength and dexterity. It will be understood that all of the percentages hereinabove given are approximate and according to recognized frequency counts, and that they are not to be considered as limiting since they are given comparatively with the present standard keyboard and since they may vary somewhat under certain frequency conditions without departing from my invention.

It will be further noted that in the use of my keyboard practically all of the more important two-letter combinations are written in the normal hand position in the middle key bank and without reaching. The exceptions are OF, AL, EL and NG, but the keyboard is so arranged that most of these combinations require finger movement into the upper and more easily reached key bank 13. In writing all of the more important two-letter combinations the arrangement is such that different fingers are employed thereby avoiding the use of the same finger in writing successive letters of important two-letter combinations.

In a typewriter construction wherein the type bars are supported by an arcuate-shaped type bar segment, the point at which the type bars collide with each other in moving to a common printing point is determined by the lateral distance between the type bar mountings on the segment. This spacing is governed, in part, by the location of the respective keys in the keyboard.

According to this invention, the letter keys are so relatively arranged that, with respect to the more important letter and two-letter combinations, the point of collision of the respective type bars is moved closer to the printing point whereby greater speed may be attained. In my keyboard, even though some of the keys of the more important two-letter combinations are adjoining each other, namely; SA, AT, NE and OI, there is no instance in which the key levers of important two-letter combinations are adjoining each other. On the other hand, with the present standard keyboard, there are instances wherein the key levers of important two-letter combinations are adjoining each other; for example, the combination ED. Consequently, there is less danger of early type bar collision with my keyboard arrangement than with the keyboard arrangement of the present standard typewriter, thereby increasing the speed of a typewriter equipped with my keyboard over a typewriter having a standard keyboard.

The foregoing features enable an operator to learn typing more quickly; greater speed may be attained; and less dexterity is required to attain greater typing speed. Also, greater typing accuracy is assured.

I claim:

1. In a typewriter keyboard, three banks or horizontal rows of keys, the several keys of said banks or rows being so arranged that the middle row or bank contains the letter keys R, S, A, T, D, H, N, E, O and I arranged consecutively, the upper row or bank contains the letter keys W, C,

U, M, G, P, L, Q, Y and B, and the lower row or bank contains the letter keys J, K, F, X, Z and V.

2. In a typewriter keyboard, three banks or horizontal rows of keys, the several keys of said banks or rows being so arranged that the middle row or bank contains the letter keys R, S, A, T, D, H, N, E, O and I arranged consecutively from left to right across the keyboard, the upper row or bank contains the letter keys W, C, U, M, G, P, L, Q, Y and B, arranged consecutively from left to right across the keyboard and the lower row or bank contains the letter keys J, K, F, X, Z and V arranged consecutively from left to right across the keyboard.

3. In a typewriter keyboard, three banks or horizontal rows of keys, the middle of said banks containing the letter keys R, S, A, T, D, H, N, E, O and I, said letter keys R, S, A and T being located in four guide positions for the left hand to be actuated by the little, third, middle and index fingers, respectively, and the letter keys N, E, O and I being located in four guide positions for the right hand to be actuated by the index, middle, third and little fingers, respectively, the remaining letter keys being arranged in the other two rows or banks located on the opposite sides of said middle row.

4. In a keyboard for typewriters, three horizontal rows or banks of letter keys, the middle of said rows containing the letter keys R, S, A, T, D, H, N, E, O and I, the letter keys R, S, A, T on the left and N, E, O, I on the right serving as guide keys being adapted to be struck by the little, third, second and index fingers of the left hand and the index, second, third and little fingers of the right hand, respectively, the letter keys D and H also being arranged to be struck by the index fingers of the left and right hands, respectively, reaching in the middle row, the remaining letter keys being arranged in the rows on the opposite sides of said middle row with the letter keys of least importance in the lowermost row.

5. In a typewriter keyboard, upper, lower and middle banks or horizontal rows of keys, said middle bank containing the letter keys R, S, A, T, D, H, N, E, O and I in the order named reading from left to right as viewed from the front of the keyboard, said letter keys R and I being positioned for actuation by the little fingers, S and O by the third fingers, A and E by the middle fingers and TD and HN by the index fingers of the left and right hands, respectively, the remaining letter keys being arranged in the upper and lower rows on opposite sides of said middle row with the letter keys of least importance, including J, K, X, Z and V arranged in the lower row.

6. In a typewriter keyboard having upper, lower and intermediate and laterally spaced banks of letter keys, the intermediate bank containing, from left to right, the letter keys R, S, A, T, D, H, N, E, O and I, the upper of said banks containing from left to right the letter keys W, C, U, M, G, P, L, Q, Y and B, and the lower of said banks containing, from left to right, the letter keys J, K, F, X, Z and V, the keys of said banks being arranged to provide diagonal rows of letter keys consisting, reading from the upper to the lower banks, of the keys WRJ, CSK, UAF, MTX, GDZ, PHV, LN, QE, YO and BI.

7. In a typewriter keyboard having a plurality of key rows, an intermediate row having four left-hand guide letter keys RSAT for the little,

third, middle and index fingers, respectively, and four right hand guide letter keys NEOI for the index, middle, third and little fingers, respectively, said letter keys being so arranged in said row that the two-letter combinations ER, IN, IT, ES, EN, ON, OR, AT, AR, AN, ST, OT, ET and IS are adapted to be actuated by different fingers according to the standard touch method and without movement of the hands and fingers from said hand guide positions, the remaining letter keys, excepting D and H, being arranged in rows on the opposite sides of said intermediate row.

8. In a typewriter for writing the English alphabet, a keyboard containing three banks of letter keys, the intermediate bank containing in the order named reading from left to right the keys R, S, A, T, D, H, N, E, O, I, the upper bank containing in the order named reading from left to right the keys W, C, U, M, G, P, L, Q, Y and B, and the lower bank containing in the order named reading from left to right the keys J, K, F, X, Z, V, semicolon, period and comma, in which keyboard the letter key banks are so arranged that the letter keys are disposed in diagonal rows for operation in accord with the

touch method of typing, the arrangement being such that the V, H, P, L, N and semicolon, keys are adapted to be actuated by the index finger of the right hand, the X, T, M, G, D and Z keys by the index finger of the left hand, the Q, E and period keys by the middle finger of the right hand, the U, A and F keys by the middle finger of the left hand, and the remaining keys by the third and little fingers of the right and left hands.

9. In a typewriter for writing the English alphabet, a keyboard having upper, lower and intermediate horizontal rows of letter keys wherein the several letter keys for the alphabet are so arranged that the R, S, A, T, N, E, O and I keys may be struck by different fingers without shift of the fingers or hands in any direction other than striking, the D and H letter keys may be struck by shift of the index fingers within the intermediate row, the letter keys W, C, U, M, G, P, L, Q, Y and B may be struck by fingers reaching into the upper row, and the letter keys J, K, F, X, Z and V may be struck by reaching a somewhat greater distance into the lower row.

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