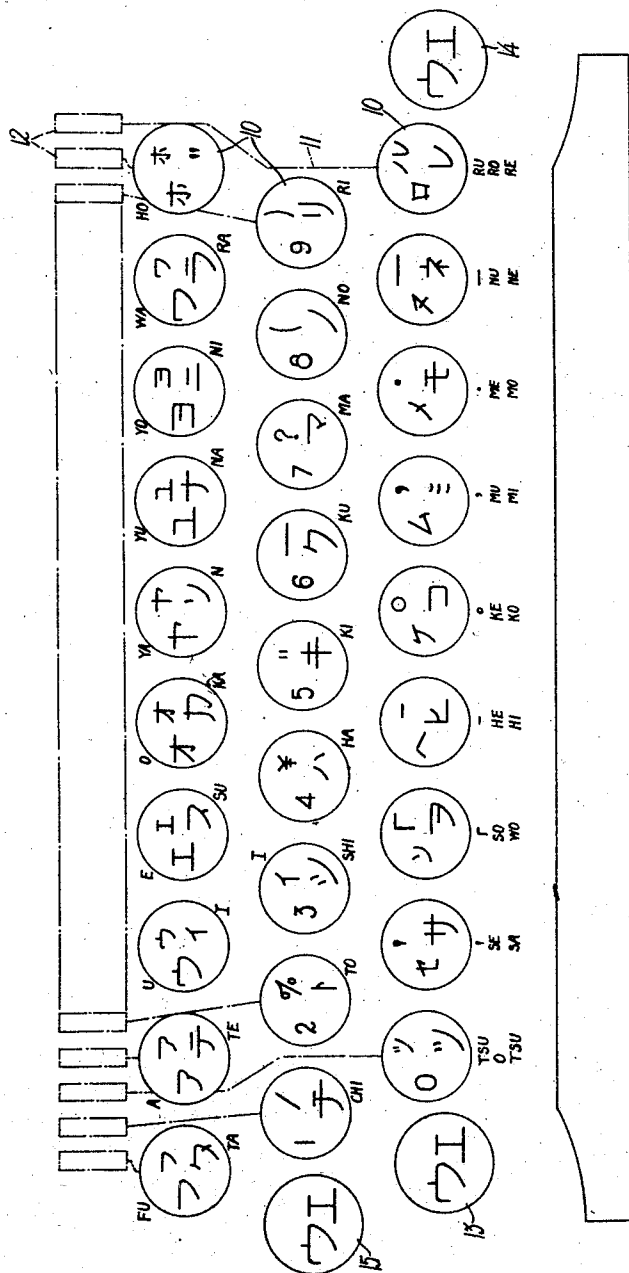


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B. C. STICKNEY
TYPEWRITING MACHINE
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TYPEWRITING MACHINE.

Application filed December 4, 1924. Serial No. 753,802.

This invention relates to a keyboard for typing the Japanese katakana alphabet. This application is in part a continuation of my application No. 617,912, filed February 9, 1923.

The main objects of the invention are to devise a keyboard which conduces to ease of learning and rapidity of operation, and which is systematically organized, and in which the labor is divided about evenly between the right and left hands, and also appropriately divided among the fingers of each hand, and in which the dakuon mark is typed by one hand and the root character by the other hand in a machine in which the other desiderata are secured. Katakana is usually written downwardly in vertical lines; but an object of the invention is to give added impetus to the movement which has progressed for many years in Japan, to introduce horizontal writing from left to right. To this end the present typewriting machine is organized to type horizontally from left to right, as in ordinary English typing, and the machine is of the usual Underwood construction throughout, except for the characters on the keys and the types which correspond thereto.

A feature of the invention is the disposition of the relatively numerous katakana characters upon the relatively few keys of a double-shift standard typewriter, so that most of the typing will be performed in lower case upon the most convenient keys, namely, those in the second and third banks of a three-bank keyboard, and so that for the most part the keys in the several groups follow the order of the katakana alphabet, and so that the lower-case characters less frequently used are disposed upon a less desirable bank of keys, namely, the front bank, and so that the remaining lower-case characters shall be disposed upon one of the shifts, and also so that the letters which combine with the dakuon and semi-dakuon are placed upon one side portion of the keyboard (preferably the right), while the the dakuon mark is located at the other side of the keyboard, for operation by the left hand, and so that relatively infrequent characters (each being located in its own key group), are placed with regularity upon one shift and all in one bank, and so that the eleven special undersized characters, which are mainly vowels, are mainly placed upon

a shift in a location where they are readily found, and so that upper-case numerals, punctuation marks and signs may be so disposed as to conduce to systematization of the keyboard and the desired grouping and ordering of the katakana characters. This is done in such a way that the keys in the three-bank machine are readily located by the operators upon the standard machine, so that anybody skilled in operating either a four-bank standard or three-bank portable keyboard may readily use the other keyboard. Other features and advantages will hereinafter appear.

The accompanying drawings show a diagrammatic plan of a three-bank katakana keyboard for the Underwood portable typewriter.

The keys 10 are connected by the usual lever trains 11 to the types 12, which lie in the type-rest in front of the platen (not shown) in an order dependent upon the order of the keys as usual. There are shown the usual two shift-keys 13, 14. There are 28 keys. The keyboard is standardized and harmonized in a manner that will be presently explained. An extra shift-key 15 brings into use the third case, or the third set of types on the type-bars, as usual in the Underwood portable typewriter.

The order of the keys is as follows:

First (front) bank, lower-case, TSU SA WO HI KO MI MO NE RE; upper-case O SE SO HE KE MU ME NU RO. Extra or third case-shift, TSU (small) apostrophe, capital, hyphen, half-dakuon, comma, period, prolongation mark, RU.

Second bank, lower-case, CHI TO SHI HA KI KU MA NO RI. Upper-case, English numerals 1 to 9. Extra shifts, signs, also small I and Yen.

Third bank, lower-case, TA TE I SU KA N NA NI RA.

Third bank, upper case, FU A U E O YA YU YO WA HO. The corresponding undersized characters are placed in the extra or third shift on this bank.

In the Japanese language there are sounds which cannot be denoted in ordinary katakana, such as KIA, KIU, KIO, etc., and it is a common practice to denote such combinations by the aid of undersized duplicate characters, which are nearly all placed upon the rear bank of keys, all the keys in said bank being, therefore, in upper case and ex-

tra shift, for duplicate characters, whose location is rendered easy to memorize.

Nearly all of the Japanese katakana characters represent separate syllables each comprising a consonant and a vowel; and the rear bank of keys, upper case shift, is set apart for the infrequent simple vowels A, U, E, O, and also the infrequent compound vowels YA, YU, YO, and WA. These are characters that are also assigned to the extra shift in the rear bank or row, partly because of their relative infrequency of use, and partly because in using katakana it is also customary occasionally to write these characters in reduced size, as just explained. These small characters are upon the extra shift of the keys having their main characters, and hence when writing the character either large or small, the operator has only to memorize a single key therefor. Upon this bank are also placed the characters FU and HO, each of which is sometimes written in undersized form. The entire two shifts of the rear bank therefore consist of full-sized characters on the upper case shift, and their undersized duplicates upon the extra shift. This conduces to the orderly and systematic character of the keyboard.

The simple vowel I, because of its frequency, is placed in the third bank, close to the A and U keys, that is, in the vowel group to which alphabetically it belongs. This key for I has also an undersized duplicate in the extra shift in the second row. The only remaining letter having an undersized duplicate is TSU, which, because of its moderate frequency, is placed in the extra shift in the first or front bank, but within the T group where alphabetically it belongs.

Of the T group of characters, TA, TE, CHI and TO are placed in the third and second banks, because of their great frequency of use, the group being completed by TSU at the left-hand end of the front bank. The alphabetical order of the characters in this and nearly all of the remaining groups is substantially employed throughout the keyboard, for ease of learning and speed of manipulation.

Of the S group, the frequent letters SHI and SU are placed in the second and third banks, while SA, because of its moderate frequency, is placed in the lower case in the first bank. This group also includes two infrequently-used characters SE and SO, which are so seldom used that they are placed in the upper-case shift and in the first bank. It will be seen that the keys in the S group adjoin one another, and hence are easily memorized and located.

In the H group the character HA is placed in the second row because of its frequency, while upon an adjoining key in the front bank is placed the infrequent lower-case character HI. Upon the same key with HI

is placed in upper-case the infrequently-used HE. This group also alphabetically comprises the character HO, but this key, because of its infrequency of use, and because of the relative prominence of the vowel sound in the syllable, is placed in upper case in the rear bank (preferably at the right-hand end), and in common with other keys in this bank it carries an undersized duplicate character. The character FU, which also belongs in the H group, is also placed in upper case in the third bank because it carries an undersized duplicate (in the extra shift), and preferably at the left-hand end of the bank.

In the K set the frequent characters KA, KI and KU are placed on the second and third banks, while the less used character KO is placed in lower case on the front bank. The infrequent character KE is placed in the upper-case shift on the KO key. All of the K characters adjoin one another to form a group.

The M group comprises the frequent character MA in the second bank, the less frequent characters MI and MO in lower case in the first bank, and the infrequent characters MU and ME in the upper-case shifts of the keys MI and MO. This group therefore comprises three adjoining keys, so that all letters in this group are easily memorized or located.

In the N set the frequently-used characters N, NA and NI are placed on the third bank, and the frequent character NO on the second bank (adjoining the key for NI). Adjoining NO is placed the key for NE in lower case on the first bank; the same also carrying the infrequent character NU in upper case. It is noted that the various groupings differ in form and arrangement, but that this is unobjectionable, and that the desired orderly arrangement and systematizing of the keyboard are secured, and the desired placing of the frequent characters in the second and third banks, and the other numerous advantages gained, without breaking up any group, with the unimportant exceptions elsewhere noted.

In the R group the frequent characters RA, RI and RE adjoin one another on keys in the three banks, while the less-used character RU is placed in the extra shift upon the RE key in the front bank. The infrequent character RO is given an upper-case position upon the RE key. The order of the characters following mainly the alphabetical order in nearly all of the principal groups, is important, the problem being to prepare a keyboard which can be so easily mastered as to constitute a substantial aid to the introduction into the Japanese Empire of the typing of katakana in horizontal lines.

The dakuon key is placed at the right-hand end of the keyboard in the third bank, and

may be written immediately after any of the first five characters in the third bank, or any of the first six characters in the second bank, or any of the first five upper or lower-case characters in the third bank, (all of these keys being operable by the left hand, while the dakuon key is operated by the right hand, to secure celerity.

Moreover, by placing the dakuon key on the right-hand side of the keyboard, the work is more evenly divided up between the right and left hands; and the placing of the prolongation mark on the right-hand side of the keyboard conduces also to even division of work between the hands. The dakuon key is a silent key which does not feed the carriage, and the dakuon mark is typed closely to the right-hand side of the upper portion of the previously typed character on the work-sheet; the same being also true of the semi-dakuon mark on the fifth key in the front row.

The fewness of the keys compared with the number of characters of the alphabet, has rendered it necessary to place eight of the principal characters of the alphabet in upper-case positions, and a substantial advantage is gained by putting all of these upper-case characters in the front bank of keys, since it conduces to orderly arrangement or systematizing of the keyboard, inasmuch as in other banks no prime characters are necessarily placed in upper-case positions. For system and order there is also placed in the same bank the TSU key (which bears an undersized third-case duplicate). This is done without separating this character from the T group. Thus all of the katakana keys in the first bank have prime lower-case letters, and they also have all of the prime upper-case characters. By adopting this arrangement, it is rendered possible to place all of the high-frequency lower-case characters in the convenient second and third banks, while at the same time grouping most of the characters alphabetically. That is, substantially all of the characters are placed in close groups, in such a manner that the most frequent characters occupy the second and third banks, and the moderately frequent characters the lower-case positions in the front bank, with the characters in each group mainly following the alphabetical order. As a means to this same end, the first nine numerals have been placed in upper-case positions upon the keys in the second bank. This placing of the numerals conduces to systematizing the keyboard, because it avoids the necessity of assigning the eight infrequent primary upper-case characters SE, SO, HE, KE, MU, ME, NU and RO to the second bank (which would render it necessary to put the numerals in upper-case on the first bank, and would therefore render it impossible to secure the desired group-

ing and the desired alphabetical order of the letters of several groups). It will be seen that to the first bank are allotted the numeral "0" and the most infrequent characters, and also characters which are somewhat more frequent but still not so frequent as those in the second and third banks.

As further conducing to the orderly organization of the keyboard, the extra shift of the second bank of keys is (with the exception of the key I) devoted to punctuation marks and signs. The first bank nearly all consists of lower-case letters of moderate frequency and upper-case letters of little frequency and the numeral "0"; the second bank consists mainly of normal or lower-case letters of high frequency and upper-case numerals, and third case punctuation marks and signs; and the third bank consists of high-frequency letters in lower case and upper-case characters of low frequency and having third case undersized duplicates, these being mainly vowels. The main vowel group and also the T, S, H, K, N, M and R groups are all represented in the second and third banks, and where necessary the various groups extend into the first bank. All of the principal characters are in lower-case positions in the second and third banks, and perform the largest proportion of the typewriting.

By assigning the upper-case numerals to the second bank, they do not prevent the placing of I, with its upper-case duplicate, in the third bank or row, nor the placing of TSU with its upper-case duplicate in the first bank, whereby the desired grouping of the vowels and T characters is secured.

The portable keyboard composes a unit which corresponds with a group of twenty-eight keys, viz., the three front rows of the standard keyboard, namely, the first nine keys in each of the first two rows and ten keys in the third row. The small characters in the fourth bank of the standard keyboard in said application are given third-shift positions in the rear bank of the portable keyboard.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:—

1. A three-bank three-case typewriter-keyboard having the characters A, U, E, O, YA, YU, YO, WA on a shift in the third bank, the characters TA, TE, I, SU, KA, N, NA, NI, RA in lower case in the third bank, the characters CHI, TO, SHI, HA, KI, KU, MA, NO, RI in lower case on the second bank, the characters TSU, SA, WO, HI, KO, MI, MO, NE, RE in lower case on the first bank, the first bank also having on a shift the characters SE, SO, HE, KE, MU, ME, NU, RO, the usual katakana al-

phabet, all of said characters having the order given, and the first bank having the character RU on the same key as RE and RO, whereby the keyboard is divided into groups corresponding roughly with katakana groups.

2. A three-bank keyboard having the characters A, U, E, O, YA, YU, YO, WA and small duplicates thereof in two cases in the third bank, the characters TA, TE, I, SU, KA, N, NA, NI, RA in lower case in the third bank, the characters CHI, TO, SHI, HA, KI, KU, MA, NO, RI in lower case in the second bank, and the characters TSU, SA, WO, HI, KO, MI, MO, NE, RE in lower case in the first bank, said keyboard having third-case punctuation-marks and signs in the first and second banks, and having upper-case or second-case numerals in the second bank, except the numeral 0, and having upper-case or second-case characters SE, SO, HE, KE, MU, ME, RO and the numeral 0 in the first bank.

3. A three-bank keyboard having the characters A, U, E, O, YA, YU, YO, WA and small duplicates thereof in two cases in the third bank, the characters TA, TE, I, SU, KA, N, NA, NI, RA, in lower case in the third bank, the characters CHI, TO, SHI, HA, KI, KU, MA, NO, RI in lower case in the second bank, and the characters TSU, SA, WO, HI, KO, MI, MO, NE, RE in lower case in the first bank, said keyboard having third-case punctuation marks and signs in the first and second banks, and having upper-case or second-case numerals in the second bank, except the numeral 0, and having upper-case or second-case characters SE, SO, HE, KE, MU, ME, RO and the numeral 0 in the first bank, and also having FU and HO in the second and third cases in the third bank, together with their own undersized duplicates.

4. A three-bank keyboard having the characters A, U, E, O, YA, YU, YO, WA in a shift in the third bank, the characters TA, TE, I, SU, KA, N, NA, NI, RA in normal or lower case, in the third bank, the characters CHI, TO, SHI, HA, KI, KU, MA, NO, RI in lower case in the second bank, and the characters TSU, SA, WO, HI, KO, MI, MO, NE in lower case in the first bank, having

upper-case or second-case characters SE, SO, HE, KE, MU, ME, RO in the first bank, and also having a dakuon mark on a silent key in lower case at the right-hand end of the keyboard; said keyboard also having the characters RE and RU forming a group with said characters RI and RO.

5. A three-bank keyboard having the characters A, U, E, O, YA, YU, YO, WA, and their undersized duplicates in shifts in the third bank, the characters TA, TE, I, SU, KA, N, NA, NI, RA in lower case in the third bank, the characters CHI, TO, SHI, HA, KI, KU, MA, NO, RI in lower case in the second bank, and the characters TSU, SA, WO, HI, KO, MI, MO, NE, RE in lower case in the first bank, having upper-case or second-case characters SE, SO, HE, KE, MU, ME, RO in the first bank, also having a dakuon mark on a partially silent key at the right-hand end of the third bank, and also having a prolongation mark and other signs in third case in the first bank, and also having RU and undersized TSU in third case in the first bank, and undersized I and signs in third case in the second bank, and nine Roman numerals in second case in the second bank, and numeral 0 in second case in the first bank.

6. A three-bank Japanese katakana keyboard for a three-case machine, having lower or normal case characters as follows: third bank, TA, TE, I, SU, KA, N, NA, NI, RA, dakuon; second bank, CHI, TO, SHI, HA, KI, KU, MA, NO, RI; first bank, TSU, SA, WO, HI, KO, MI, MO, NE, RE; and having second or upper case characters as follows: third bank, FU, A, U, E, O, YA, YU, YO, WA, HO; second bank, Roman numerals; first bank Roman numeral 0, also the characters SE, SO, HE, KE, MU, ME, NU, RO; and also having third or extra case characters as follows: first bank, undersized duplicates of the characters in second case in said bank; second bank characters for yen, under-sized duplicate for I, and various signs such as division mark, per cent, underscore, interrogation and parenthesis; third bank, semidakuon, RU, undersized duplicate, of TSU, and various signs such as hyphen, comma, period and prolongation mark.

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