J. F. ALLARD.

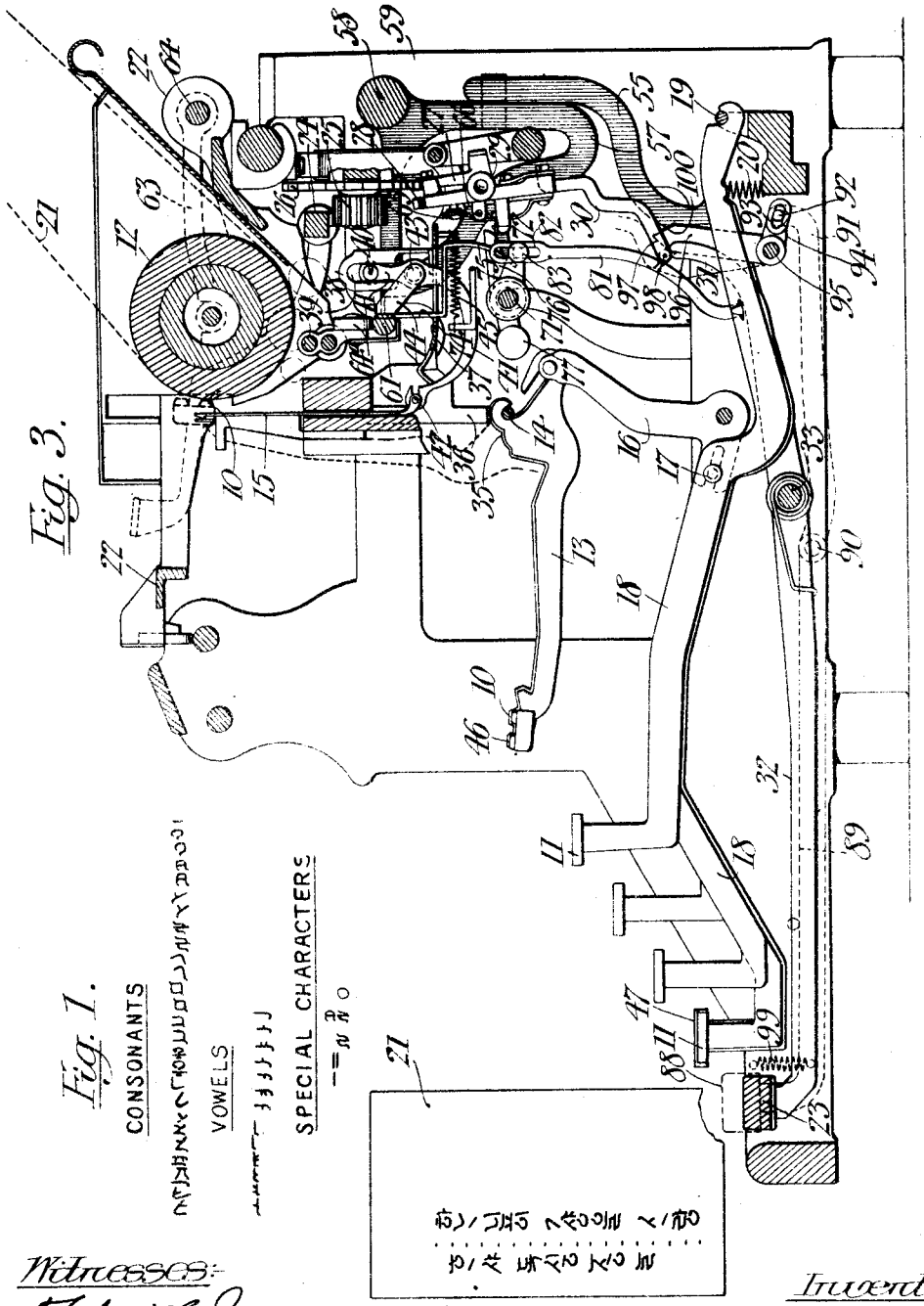
TYPE WRITING MACHINE.

APPLICATION FILED APR. 12, 1913.

1,169,739

Patented Jan. 25, 1916.

4 SHEETS—SHEET 1.



Witnesses:
Titus H. Irons
Geo. W. Maylor

Inventor:
J. Frank Allard
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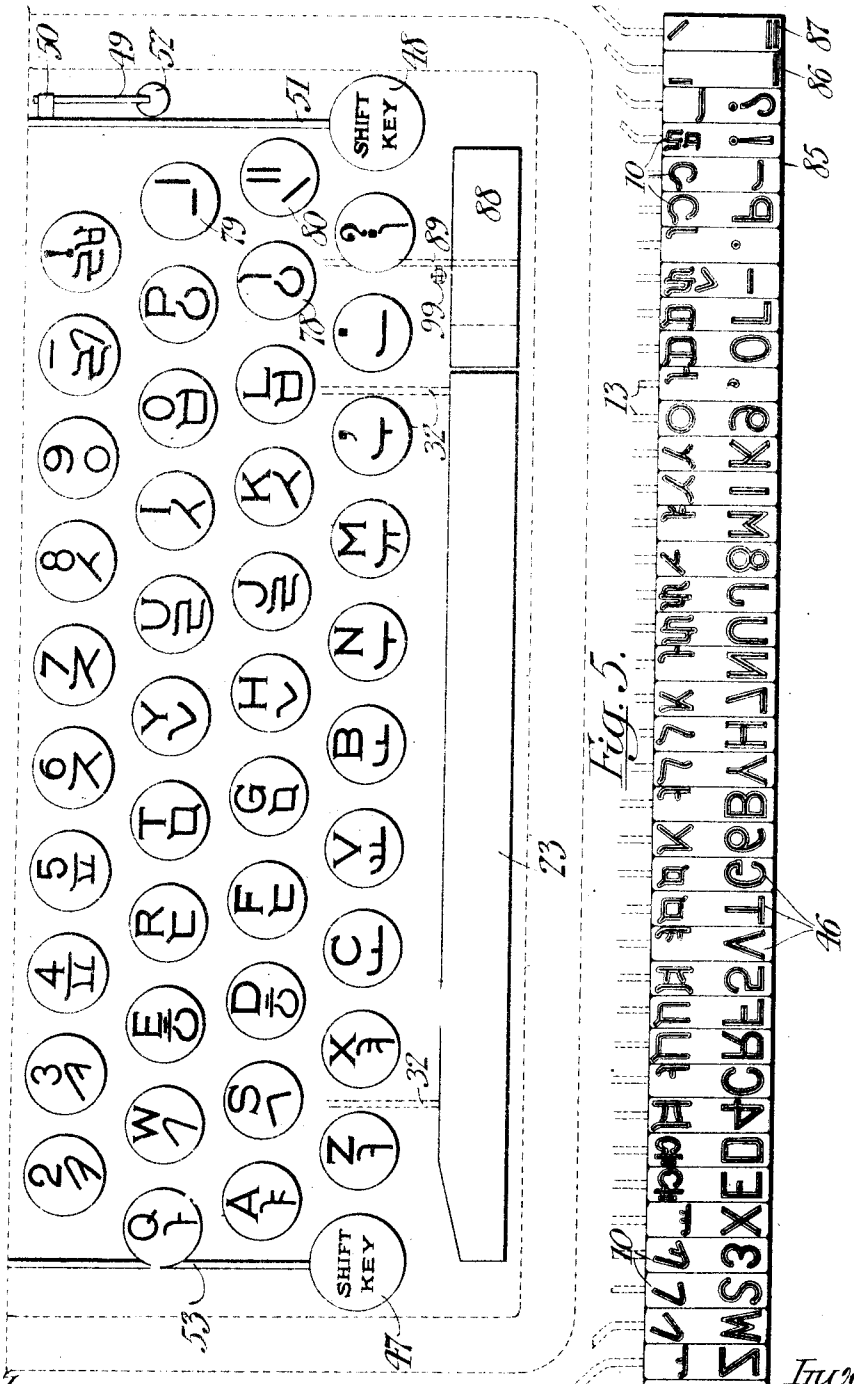

Fig. 5.

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Fig. 1.

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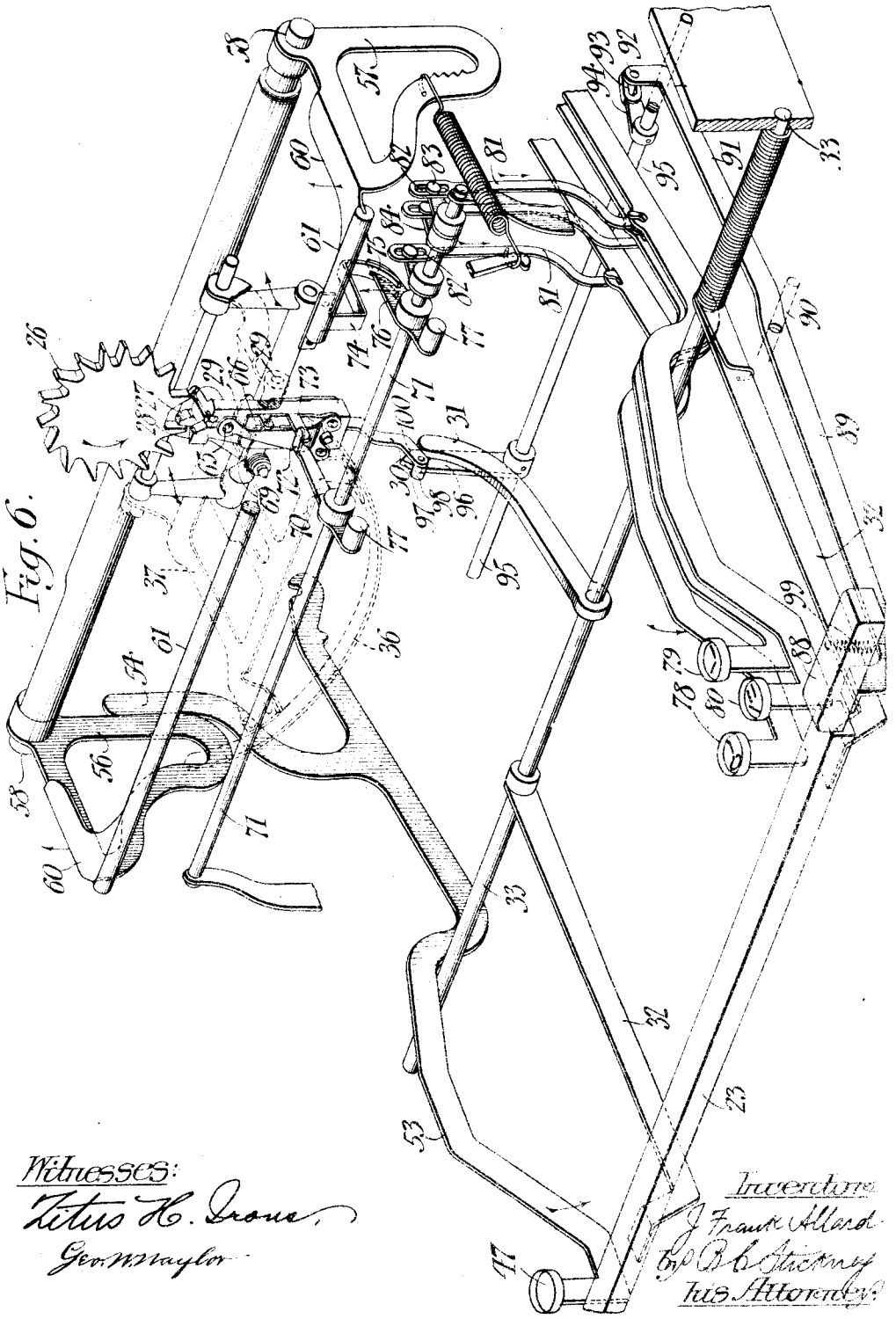

Fig. 6.

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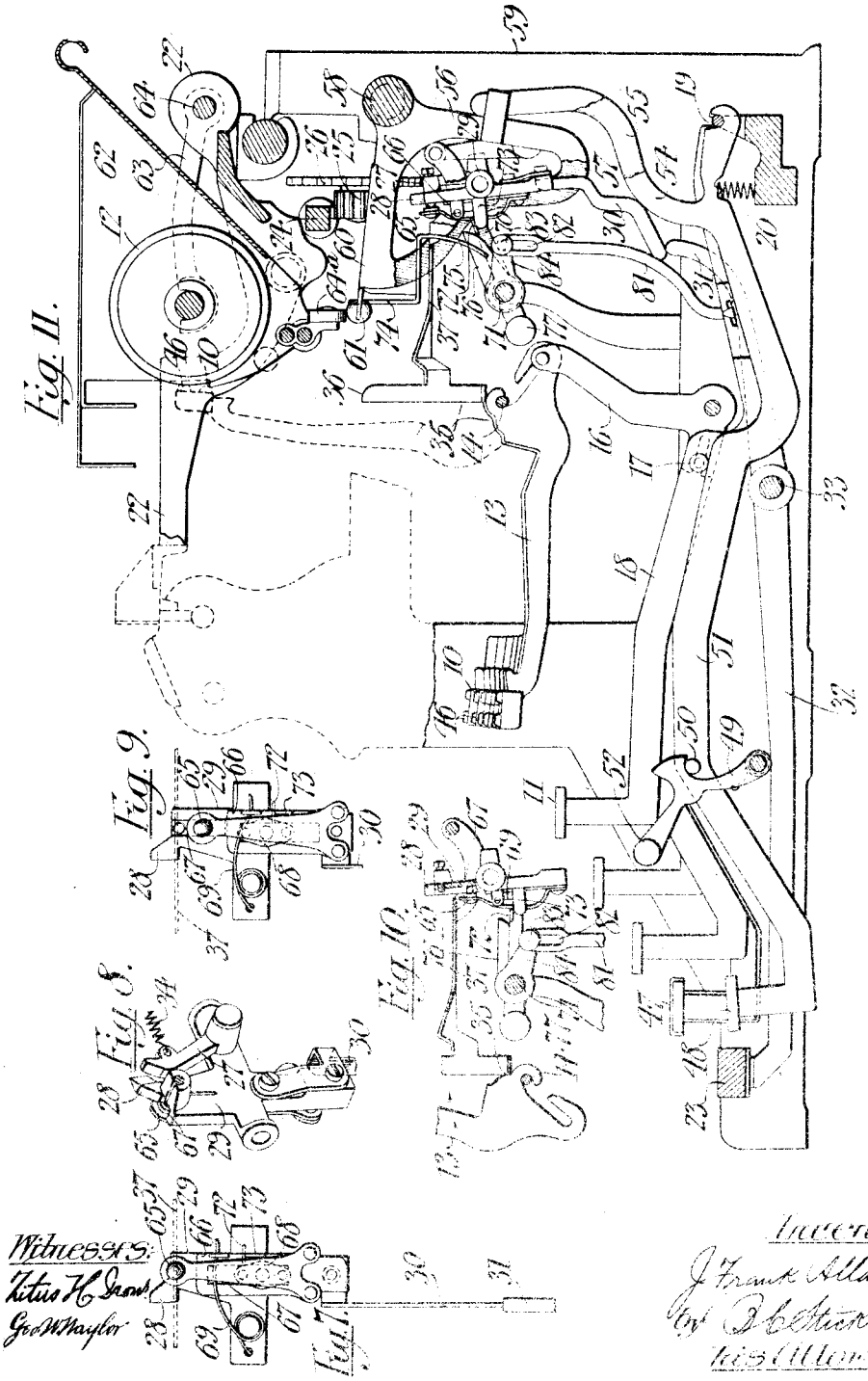

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UNITED STATES PATENT OFFICE.

J FRANK ALLARD, OF BROOKLYN, NEW YORK, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,169,739. Specification of Letters Patent. Patented Jan. 25, 1916.

Application filed April 12, 1913. Serial No. 760,617.

To all whom it may concern:

Be it known that I, J FRANK ALLARD, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates primarily to typewriting machines constructed to write in languages such as Korean, Chinese, Japanese, etc., in which independently printed characters are grouped side by side and one above another, for the purpose of making units or logograms.

The machine shown in the drawings is constructed to write Korean language; but certain features of the invention can be used in writing other agglutinate languages. A Korean line of writing extends from top to bottom of the page; and it is one of the objects of the present invention to write such language without the necessity of a complicated mechanism, and particularly to adapt a machine of ordinary construction to write such language.

In writing Korean according to the present invention, the work-sheet is placed in a typewriting machine side first, with its top edge at the left, and its bottom edge at the right. The characters are placed cumbent or crosswise upon the type-bars with the tops of the characters at the left, so that the impressions made thereby upon the work-sheet are in cumbent positions. The paper carriage may be caused to have step-by-step or letter-feeding movements from right to left; and when a line of writing is completed, the sheet may be removed, and may be turned around and read from top to bottom in the manner customary with the Korean nation. While the paper is in the machine, it may be line-spaced by advancing the platen in the manner usual in writing English on typewriting machines, and hence several lines may be written on the sheet, all of which will appear in proper sequence from right to left, when the work-sheet is removed and turned around so as to read the writing from top to bottom.

I also aim to overcome the difficulty encountered in constructing a machine to carry out the above method of operation, which is occasioned by the necessity of grouping several Korean or other agglutinate characters or syllables or sections together; the difficulty occurring because of the necessity of having the types placed sidewise on the bars, and yet occupying but little room in the type basket.

In writing Korean down a page, characters are grouped one under another, as many as four characters, syllables or sections sometimes being placed one under another in a single complete grouping or logogram. Now when the work-sheet is turned quarter-way around, so as to write the line in the manner above specified, it follows that owing to the necessity of providing sectional or syllabic types that will print in the required different positions in the several groups, the types must be of undue width, that is, of a width inconsistent with the necessary close arrangement of the types in the type basket. Sometimes the several syllabic characters or sections when grouped together on a printed sheet, form a single grouping or logogram which may be twice as high as it is wide. Hence in the type basket, the several types by which said logogram may be printed in cumbent position, would be so disposed that they would take up twice the ordinary lateral room in the type basket; since each character would need to be so placed on the type bar, that it would strike the platen in the proper relationship to other characters; that is, at one side thereof. Some of the types would have to be double or even quadruple width, which would be impracticable, or else the sizes of all the characters would have to be reduced to an extent to be prohibitive. Another difficulty that presents itself is the apparent necessity for making very many duplicate characters, since in some cases a consonant or section must be printed in three, or perhaps more, different positions upon the work-sheet, in combination with other characters, thus making it necessary to provide three or more type-bars for each of such characters. In overcoming these difficulties, I have arranged to make the principal consonants, syllables, sections or characters of a size nearly equal to the letter-feeding movement of the carriage; and in writing each Korean complete grouping or logogram, I first print the character or characters forming the first part or section of the

logogram, then space the carriage, and then print the character or characters forming the second part of the same logogram or grouping. Thus every character in each grouping may have ample room, and may be of substantial dimensions, without the necessity of having extra wide types for this purpose. None of the types need to be of excessive width, and hence there is ample room in the type basket for them all. Moreover, the necessity of having the same character in different positions upon different type-bars is largely avoided.

In order to avoid errors through unintentional superposition of consonants upon consonants, or other objectionable results, the operator needs only to remember to operate the carriage-spacing key after each vowel is written, whether the vowel be single or double. The carriage is not caused to feed by the operation of the character type keys, but the carriage feeding mechanism is always silent, and it will feed only when a space-key is operated. In using my machine, therefore, the operator will touch two or three keys forming the first syllable or part of a group, the last of these keys being a vowel; and will immediately touch a space key and thus space the carriage, and will proceed to complete the group. If the word or logogram is long, the operator will again touch a space-key and add another group, and so on. After the completion of the word or logogram, the carriage is spaced to produce the necessary blank interval between the words. The types constitute sections of the syllable or of the final complete character or logogram, and these types or sections are mounted to strike at the same printing point, so that their imprints would be superposed, but by means of said space-key a relative movement is effected between the work-sheet and the types, to enable the type sections to combine their imprints to build up the required logogram or multiple-space character.

Another feature of the invention relates to equipping the same machine for writing in another language at will, as for instance, English or French.

Still other features and advantages will also hereinafter appear.

In the accompanying drawings, Figure 1 shows the Korean consonants and vowels by means of which the written logograms, units, or groupings of the Korean language are built up; the vowels being generally placed above or at one side of the consonants, as illustrated at Fig. 2. Fig. 1 also shows some special characters used in writing Korean. Fig. 2 shows a work-sheet on which are written some Korean logograms; each line of writin reading from top to bottom, and the lines being placed one at the side of another. Between the lines of writing appears a series of dashes, which are used herein diagrammatically to indicate the letter-feeding movements of the paper carriage, or in other words, to show the sub-divisions of the line of writing; from which it will be noticed that each of the consonants takes up about an entire sub-division or letter-space. Fig. 3 is a sectional side elevation, taken about centrally from front to rear of a typewriting machine of the Underwood style and constructed in accordance with the present improvements. Fig. 4 is a plan of the keyboard. Fig. 5 is a diagrammatic plan of the types, nearly as they appear in the type basket. Fig. 6 is a perspective front view of the principal parts of the key-operated mechanism, showing clearly the devices for silencing the letter-feeding mechanism. Fig. 7 is a front view of the letter-feeding or escapement dog rocker, showing the positions of the parts when English is being written on the typewriter. Fig. 8 is a perspective rear view of the parts seen at Fig. 7. Fig. 9 is a front view similar to Fig. 7, but showing the normal positions of the parts for writing Korean. Fig. 10 is a sectional side elevation to illustrate the movement of the universal bar when the letter-feeding mechanism is silenced by reason of the operation of one of the special all-Korean keys when the case-shift mechanism has been shifted to upper-case or abnormal position. Fig. 11 is a view similar to Fig. 3, but showing the mechanism positioned to write English words.

The Korean types 10 are connected to figure keys 11, to strike a platen 12. In many respects the machine illustrated in the drawings resembles the well-known Underwood front-strike writing machine, the types being mounted upon bars 13 which are pivoted upon a curved fulcrum wire 14 to strike rearwardly through a ribbon against the front side of said platen 12, the ribbon being mounted upon the usual vibrator 15, which at every key stroke lifts the ribbon to cover the printing point and then drops it to uncover the printing plant. The type-bars are driven by bell cranks 16, which have pin-and-slot connections at 17 to levers 18 carrying said keys 11, the levers being fulcrumed at their rear ends upon a rod 19 and having returning springs 20, and being connected between their ends to said bell cranks 16. The work-sheet 21 is seen at Fig. 3 as having been placed around the platen, and a Korean type is seen as striking the same.

The Korean type characters 10 are placed crosswise on the type bars 13, so that the type impressions upon the work-sheet 21 will appear cumbent. Said work-sheet having been inserted sidewise into the machine, as will be explained, the impressions will therefore appear in proper position one under another when the sheet is taken out and

turned around so as to bring its top into proper position to be viewed by the reader.

Fig. 5 shows a diagrammatic plan or projection of the types as they appear in the type basket, the types being in the form of raised reverse characters, as shown. The impressions made by the types are seen at Fig. 1, in which figure the consonants are shown separately from the vowels and from the special or arbitrary characters. At Fig. 2 are seen two lines of writing upon the work-sheet 21, the right-hand edge of which, it will be understood, is introduced first into the typewriting machine, the letters being written from top to bottom of the sheet, but appearing while in the machine to be written from left to right.

As will be apparent from an inspection of Figs. 1 and 5, the consonants usually occupy the entire width of their types, and hence occupy approximately an entire sub-division of the printing space on the work-sheet. It will be noticed at Fig. 1 that some of the consonants are duplicated; certain of them being depressed, to permit the writing of horizontal vowel marks thereover. These vowel marks are properly located on their type blocks for this purpose, as seen at Fig. 5. The vertical vowel marks may be written at the right of the several consonants seen at Fig. 1.

None of the character keys 11 will effect a letter-spacing movement of the carriage 22 on which the platen 12 is carried; but after a consonant has been written and its vowel then added thereto, the operator depresses a space key 23, which feeds the carriage 22 one space. It will be noticed that the carriage has the usual rack 24 to mesh with a pinion 25, which is connected to an escapement wheel 26, and that feeding dogs 27, 28 control the movements of said escapement wheel. These dogs are mounted on a rocker 29, from which depends an arm 30, in position to be engaged by a space-key arm 31. The space-key 23 is mounted on arms 32, which extend forwardly from a rock shaft 33, and said arm 31 extends back from this shaft. The letter-feeding movement of the carriage produced by depressing said key 23, is therefore accomplished in the manner usual in typewriting machines; the arm 31 swinging up and the rocker 29 being swung to carry the dog 28 into and the dog 27 out of engagement with the wheel 26; and a spring 34 returning the parts to normal positions upon the release of the key 23, thereby permitting the wheel 26 to escape one tooth and the carriage 22 to feed one space. Having therefore written a consonant with its accompanying vowel to make a syllable, and then depressed the space key 23 to feed the paper along, the operator proceeds to write the succeeding consonant and its accompanying vowel, to make another syllable. If it is the end of a word, the operator may depress the space-key 23 twice, so as to produce the space between words. If, however, the word is yet incomplete, the operator presses the key 23 only once, and then proceeds to write another consonant with its accompanying vowel or vowels, to form the remainder of the logogram or grouping, several examples of which are seen at Fig. 2. It will be seen that the characters are sufficiently large to be legible without making the types unduly wide; and in using the machine in this way it is only necessary for the operator to remember to press the space-kav 23 after every single or double vowel. The type sections all strike at the same printing point, and unless the paper were stepped along they could not combine to print a complete logogram or word. But said space-key moves the paper just far enough to enable the type imprints to combine to form a single multiple-space logogram. By making the type-sections strike at a single printing center, compactness of the arrangement of the types in the machine is secured. Moreover, it becomes practicable to combine the English or other Phenician alphabet types with the agglutinate type-sections.

There should appear a slight clear space between the sub-groups forming the main groupings or logograms; and in order to provide for this clearance, I form the types on a smaller pitch than would naturally conform to the letter-spacing movements of the carriage. Preferably the types are made of a suitable size for writing nine characters to the inch, while the carriage is arranged to travel one-eighth of an inch at each movement; whereby the desired clearance between the sub-groupings is secured.

The ribbon carrier 15, as usual in the Underwood machine, is caused to rise at the type strokes to cover the printing point with the ribbon. The type-bars have heels 35 which press rearwardly a universal bar 36, which is formed on the forward end of a frame 37. Rising from said universal bar is a plate 38, having a slot 39, in which is confined a pin 40 on a lever 41, which is connected at 42 to the lower end of the ribbon carrier 15; said lever being pivoted at 43 upon a bracket 44. This universal bar frame 37, it will be remembered, does not perform its usual function of operating the feed dogs 27 and 28 when Korean characters are being printed, but operates only to raise and lower the ink ribbon; the usual spring 45 being provided for returning the universal bar frame forwardly to normal position.

One of the features of invention disclosed in the drawings relates to using the same typewriting machine for writing in either of two languages at will. It will be seen at

Fig. 5 that each type block carries English letters 46 placed longitudinally of the type-bars in the usual manner, so that the letters will appear in their natural upright positions on the paper in the machine; whereby the machine is adapted to print English as well as Korean; although not limited to these languages. Any language using the Roman alphabet, or other derivative of the Phenician alphabet could be written, as well as Korean or other language using composite or agglutinate characters built up by printing several character types one after another in various positions or groupings before feeding the work-sheet, particularly where the lines of writing read up and down the page.

The Roman characters are shown placed at the extreme tips of the type-bars, and the case-shift mechanism usual in the Underwood machine is brought into requisition to enable the Roman characters to be written. Either of two shift keys 47, 48, may be used for this purpose; preferably the key 48, because it is provided with a latch 49 (Fig. 11) to catch over a pin 50 on the shift key lever 51, to hold the same down and leave both hands of the operator free for manipulating the type keys; the latch being releasable by a handle 52. Each of the shift levers 51, 53 has at its rear end an upstanding arm. These arms, designated as 54, 55, engage bell crank arms 56, 57 on a platen-shifting frame, which is hinged at 58 to the main framework 59 of the typewriter. These bell cranks comprise arms 60 which are joined at their forward ends by a shift rail 61. The platen 12 is mounted in a platen frame 62, which is connected by rock arms 63 to the main carriage 22; said rock arms extending forwardly from a rock shaft 64 in the usual manner; whereby the platen may shift up and down, but is compelled to travel with the carriage. The platen frame has a roll 64a to run upon said rail 61; and when the rail is lifted the platen and frame are thrown up to the Fig. 11 position, to enable the upper-case or English characters to print; the principal Korean characters not being able to strike the platen at this time. The arm 44, which carries the ribbon-vibrating lever 41, is fixed to said shift rail 61 to shift up and down therewith; the bodily shifting movement of the lever 41 being permitted by the length of the slot 39 in which the pin 40 works. Hence the ribbon vibrates to cover and uncover the printing point when the English alphabet is being used, as well as when the Korean characters are being used.

When writing English, it is desirable that the carriage 22 should make its letter-feeding movements automatically, as usual, at the depressions of the various type keys; and so there is connected to the case-shift mechanism a shiftable device which, when the parts are in the shifted Fig. 11 position, causes the universal bar frame 37 to operate the carriage-feeding dogs 27, 28. Said shiftable device is in the nature of an interponent 65 (Figs. 7 to 10), which is depressed or silenced at Fig. 3 while Korean is being written, but which is shifted by either shift key 47 or 48 up to effective position (Figs. 7 and 11). At Fig. 11 it will be seen that said interponent is engageable by the rear edge of the universal frame 37 to transmit the movement of the latter to the dog rocker, so that the dogs are caused to reciprocate at every type-key stroke, so that the carriage 22 may feed after each type is printed. This interponent is fixed upon a slide 66, which can be shifted up and down on the front side of the dog rocker 29; said slide having a slot 67 by which it is guided on suitable brackets 68 fixed on the dog rocker. A spring 69 tends constantly to lift the interponent to the effective position at Figs. 7 and 11; and an arm 70, which projects rearwardly from a rock shaft 71, is provided with a lip 72 to engage a lug 73 projecting from the interponent slide 66, to depress the same; the position of the rock shaft 71 being controlled by the platen shift rail 61, to which is fixed a depending arm 74, which has a slotted portion 75 to engage and depress an arm 76 fixed on said rock shaft 71. This arm 74, 75 is shown at Fig. 6 as holding down the arm 76; the parts being in position for writing Korean, and the interponent 65 being dropped out of the path of the universal bar 37.

When the shift rail 61 rises, counterweights 77 on arms 70 and 76 tend to cause said arms to rise; and this motion is assisted by the spring 69 which elevates the interponent 65 to the Fig. 7 position, so that the carriage may feed automatically while English, Roman, Greek or other suitable letters are being written; this of course making no difference in the operation of the space-key 23, which is now used only for the purpose of making spaces between words in the usual manner in writing English.

Special Korean character keys 78, 79 and 80 fail to feed the carriage, not only when the platen 12 is down as at Fig. 3, but also when it is elevated as at Fig. 11; because the upper-case as well as the lower-case characters on these keys are Korean, and it is therefore desired that the carriage should not feed at all when either upper or lower case characters are being written thereby. In order to provide that these special keys shall not feed the carriage when writing upper-case characters, each of the keys 78, 79 and 80 is provided with a silencing mechanism, which may comprise a link 81

connected at its lower end to the corresponding key lever, and its upper end having a slot 82 to engage a pin 83 provided upon an arm 84 extending rearwardly from the rock shaft 71. When the machine is in lower-case or Korean-writing position, these slotted links 82 ride idly up and down upon the pins 83; but upon the parts being shifted to the upper-case position, the three arms 84 rock up to the Fig. 11 position, so that the pins 83 shift up to the top of the slots 82. This having been done, it follows that whenever any of the three type keys 78, 79, 80 is depressed, its associated link 81 is pulled down, and thus rocks down the arm 84 and rock shaft 71 to which it is fixed, and causes arm 70 on said shaft to bear down lug 73, and thereby pull down the slide 66 and its interponent 65. This occurs before the heel 35 of the type-bar strikes the universal bar 36. When the universal bar is finally struck and moves backward, the interponent 65 is held depressed by the link 81 as aforesaid, and hence no motion is transmitted from the universal bar to the dog rocker 29 and the carriage fails to feed. This permits the use of extra keys which are not necessary for writing English. Since each of these extra keys has two Korean characters thereon, it will be understood that very few of such extra keys will suffice, so that the keyboard will not be unduly enlarged, or in other words, the keys are brought within the limits of an ordinary typewriting machine, so that very little change needs to be made in the machine in order to adapt it for writing either Korean or English at will. The types which are connected to keys 78, 79, 80 are marked 85, 86, 87 at Fig. 5.

It will be seen by comparing the keys and the types at Figs. 4 and 5, that there are upon the upper case-shift several punctuation marks, and figures and a few characters for English writing; and it will be understood that all of these would feed the carriage automatically. It will be also observed that the Korean characters upon the keys read naturally, that is, they are standing upon their feet, and appear the same on the keys as they do on the vertical line of Korean writing, whereas on the types the characters are placed in cumbent positions or crosswise on the types; or in other words, the Korean type positions at Fig. 5 are at right angles to the figures at Fig. 4, for reasons already explained.

From the foregoing it will be seen that the same machine is adapted both for writing Korean characters down a page and for writing English characters across a page, and the cost of producing the machine is only a trifle greater than the cost of producing a machine for writing Korean or only English.

The arrangement of the Korean types to print at a common center in such a way that the carriage may be spaced during the writing of a multiple-space Korean unit or sub-grouping (including several consonants and vowels) not only permits the use of large types without unduly increasing the width of the types, but also enables the number of types to be kept at such a minimum that the same typewriting machine may have capacity for a set of additional types, such as English or the like; and these English or other types may be placed upon the same type-bars or blocks as the Korean, and a case-shift mechanism may be used to print either one language or the other as required. The English types are shown as comprising an alphabet of capital letters, and these correspond to the capital shift types of an ordinary typewriting machine.

At Figs. 3 and 4 there is shown a key 88, which is depressed as soon as the last logogram or sub-grouping is written in Korean. The operation of this key causes the carriage to make two letter-feeding movements. Thus the carriage is fed not only for the last logogram or unit, but also for the space between the words. Usually when writing the last vowel in each sub-grouping or unit, the ordinary space-key 23 is depressed simultaneously with the type key; but when writing the very last character in a unit or grouping, the key 88 is depressed simultaneously with the type key. Suitable mechanism may be connected to the key 88 to enable it to produce two letter-feeding movements, or double feed of the paper carriage 22. There is illustrated herein one form of such mechanism, but any other form may be used. In the form illustrated, the carriage may make a complete feeding movement at the down stroke of the key 88, and may also make an additional complete feeding movement at the return stroke of said key 88, thus making two movements of the carriage for every complete operation of said key 88. The last-mentioned key is mounted upon a lever 89, fulcrumed at 90 on the framework, and having a rearwardly extending arm 91, which carries a pin 92 to engage a slot 93 in an arm 94, which projects from a horizontal rock shaft 95 extending across the machine. Rising from this rock shaft is an arm 96, having a cam 97 to engage a pin 98 projecting from the lower end of the dog rocker arm 30. Upon depression of the key 88, the arm 91 rises and carries up the arm 94, thereby rocking the shaft 95 and swinging the arm 96 forwardly, so that the cam 97 thereon may force up the pin 98 and pass beneath the same and clear thereof, as seen in dotted lines at Fig. 3. When the apex or point of the cam is passing under the pin 98, the dog rocker completes one movement; and after the forwardly swinging cam passes the pin, the usual spring 34 (Fig. 8) returns

the dog rocker and the carriage 22 feeds along, while the key 88 is held down by the operator. Upon releasing said key, a strong spring 99 returns the same and forces the cam arm 96 rearwardly; a second cam 100 thereon now engages the same pin 98 and again forces the same upwardly, to repeat the movement of the dog rocker 29, the latter completing its new initial stroke as the point of the cam passes rearwardly under the pin 98. The rocker 29 then makes its return stroke as the cam arm 96 completes its backward movement to normal position.

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 typewriter for the Korean or analogous language, comprising consonant and vowel types all mounted crosswise so as to make the written characters appear in cumbent positions, a carriage, letter-feeding mechanism silent during the writing of the consonants and accompanying vowels; each of said consonants occupying about an entire letter-feeding space or subdivision of the writing line, and the consonant types mounted to strike all in the same place, so that their impressions would be superposed; and a key for feeding the carriage a letter-space at a time, whereby after writing a consonant and its accompanying single or double vowel, said space-key may be operated to re-position the carriage to enable the writing of the same logogram or grouping to be completed.

2. A typewriter for the Korean or analogous language, comprising consonant and vowel types all mounted crosswise so as to make the written characters appear in cumbent positions, a carriage, letter-feeding mechanism silent during the writing of the consonants and accompanying vowels; each of said consonants occupying about an entire letter-feeding space or subdivision of the writing line, and the consonant types mounted to strike all in the same place, so that their impressions would be superposed, a key for feeding the carriage a letter-space at a time, whereby after writing a consonant and its accompanying single or double vowel, said space-key may be operated to re-position the carriage to enable the writing of the same logogram or grouping to be completed, and a second key for feeding the carriage two spaces at each operation of said second key.

3. A typewriter for the Korean or analogous language, comprising consonant and vowel types, all mounted crosswise on the type-bars so as to make the written characters appear in cumbent positions, keys to operate the type-bars, a ribbon-vibrating mechanism operated by said keys at every type stroke, a carriage, letter-feeding mechanism silent during the writing of the consonants and accompanying vowels; each of said consonants occupying about an entire letter-feeding space or subdivision of the writing line, and the consonant types mounted to strike all in the same place, so that their impressions would be superposed, and a key for feeding the carriage a letter-space at a time.

4. A typewriter for the Korean or analogous language, comprising consonants and vowel types, all mounted crosswise on the type-bars so as to make the written characters appear in cumbent positions, keys to operate the type-bars, a ribbon-vibrating mechanism operated by said keys at every type stroke, a carriage, letter-feeding mechanism silent during the writing of the consonants and accompanying vowels; each of said consonants occupying about an entire letter-feeding space or sub-division of the writing line, and the consonant types mounted to strike all in the same place, so that their impressions would be superposed, a key for feeding the carriage a letter-space at a time, and a second key for feeding the carriage two spaces at each operation of said second key.

5. A typewriting machine having a set of Korean types and a set of English types, the Korean types being set crosswise relatively to the English types.

6. A typewriting machine having a set of Korean types and a set of English types, the Korean types being set crosswise relatively to the English types, keys for operating the types, and letter-feeding mechanism silenced when Korean types are being printed, but effective when English types are being printed.

7. A typewriting machine having a set of Korean types and a set of English types, the Korean types being set crosswise relatively to the English types, keys for operating the types, letter-feeding mechanism silenced when Korean types are being printed, but effective when English types are being printed, and a ribbon-vibrating mechanism operative when either English or Korean types are being printed.

8. A typewriting machine having a set of Korean types and a set of English types, the Korean types being set crosswise relatively to the English types, keys for operating the types, letter-feeding mechanism silenced when Korean types are being printed, but effective when English types are being printed, and a ribbon-vibrating mechanism operative when either English or Korean types are being printed; said machine including a key for effecting letter-spacing movements independently of the type keys.

9. A typewriting machine having a set of Korean types and a set of English types, the

Korean types being set crosswise relatively to the English types, keys for operating the types, letter-feeding mechanism silenced when Korean types are being printed, but effective when English types are being printed, a ribbon-vibrating mechanism operative when either English or Korean types are being printed; said machine including a key for effecting letter-spacing movements independently of the type keys, and a key for effecting two letter-spacing movements at each operation thereof.

10. A typewriting machine having a case-shift mechanism, key-controlled types constructed to write in one language at one position of the case-shift mechanism and in a different language at another position of the case-shift mechanism, and letter-feeding mechanism operable by the keys only when writing one of said languages and not the other.

11. A typewriting machine having a case-shift mechanism and also having type-operating or controlling keys, a letter-feeding mechanism, a universal bar operable by the keys, an interponent normally between said bar and said letter-feeding mechanism at one position of said case-shift mechanism, and a connection from the case-shift mechanism whereby the interponent is ineffective at another position of said case-shift mechanism.

12. A typewriting machine provided with key-operated types so arranged with reference to the printing point, that consonant and vowel types will strike one by the side of another in the same subdivision of the writing line, and having a letter-feeding mechanism inoperable by the keys when operating said types whereby groupings or sub-groupings may be effected or logograms written by said types, a key for operating said letter-feeding mechanism, a set of types to write a different language, and means effective when the last-mentioned types are being used, for operating the letter-feeding mechanism at every type stroke.

13. A typewriting machine having a case-shift mechanism, a group of type-bars carrying Korean types for printing at one position of the case-shift mechanism and English or Roman alphabet types for printing at another position of the case-shift mechanism; each type-bar carrying a Korean type and a Roman type, the Roman type being set in natural position, and the Korean type being set crosswise thereto or in cumbent position.

14. A typewriting machine having a case-shift mechanism, a group of type-bars carrying Korean types for printing at one position of the case-shift mechanism and English or Roman alphabet types for printing at another position of the case-shift mechanism, each type-bar carrying a Korean type and a Roman type, the Roman type being set in natural position, and the Korean type being set crosswise thereto or in cumbent position, and keys connected to said type-bars and bearing both English and Korean characters.

15. A typewriting machine having a case-shift mechanism, a group of type-bars carrying Korean types for printing at one position of the case-shift mechanism and English or Roman alphabet types for printing at another position of the case-shift mechanism, each type-bar carrying a Korean type and a Roman type, the Roman type being set in natural position, and the Korean type being set crosswise thereto or in cumbent position, and keys connected to said type-bars and bearing both English and Korean characters; the Korean characters being shown on said keys in their upright or natural positions.

16. A typewriting machine having a case-shift mechanism, a group of type-bars carrying Korean types for printing at one position of the case-shift mechanism and English or Roman alphabet types for printing at another position of the case-shift mechanism, each type-bar carrying a Korean type and a Roman type, the Roman type being set in natural position, and the Korean type being set crosswise thereto or in cumbent position, keys connected to said type-bars and bearing both English and Korean characters, the Korean characters being shown on said keys in their upright or natural positions, and letter-feeding mechanism effective in that position of the case-shift mechanism in which the Roman alphabet is printed, but ineffective in the case-shift position when the Korean types are printed.

17. A typewriting machine having a case-shift mechanism and provided with different sets of types for use in different positions of the case-shift mechanism, the types in one set being arranged in natural positions, and those in the other set being crosswise thereto, whereby when using the first set the lines run across the page one line under another upon a work-sheet introduced head first into the machine, and when using the second set the lines run down the page by the side of one another upon a work-sheet introduced side-foremost into the machine.

18. A typewriting machine having a case-shift mechanism and provided with different sets of types for use in different positions of the case-shift mechanism, the types in one set being arranged in natural positions, and those in the other set being crosswise thereto, whereby when using the first set the lines run across the page one line under another upon a work-sheet introduced head first into the machine, and when using

the second set the lines run down the page by the side of one another upon a work-sheet introduced side-foremost into the machine, the types in the second set being capable of writing in various positions relatively to one another to make groupings or logograms; and automatic letter-feeding mechanism effective only when the types in the first set are being printed.

19. A typewriting machine having a case-shift mechanism and provided with different sets of types for use in different positions of the case-shift mechanism, the types in one set being arranged in natural positions, and those in the other set being crosswise thereto, whereby when using the first set the lines run across the page one line under another upon a work-sheet introduced head first into the machine, and when using the second set the lines run down the page by the side of one another upon a work-sheet introduced side-foremost into the machine, the types in the second set being capable of writing in various positions relatively to one another to make groupings or logograms, automatic letter-feeding mechanism effective only when the types in the first set are being printed, a letter-feeding space-key, and an additional space-key having means for producing a double letter-feeding movement.

20. A typewriting machine having a single set of keys, a single set of type-bars connected thereto, and two sets of types on said bars; one set being a Roman alphabet with the types in natural positions and the other set being a Korean or analogous alphabet with the types set crosswise or in cumbent positions upon the bars; each of said keys showing the characters on the bar to which it is connected, and both characters on each key being in natural or upright positions.

21. In a typewriting machine comprising a case-shift mechanism and a letter-feeding mechanism, the combination with a ribbon vibrater, of type-controlling keys, a bar universal to said keys operating said vibrator, and an interponent between said bar and letter-feeding mechanism connected to said case-shift mechanism for rendering the letter-feeding mechanism effective at one position and ineffective at the other position of said case-shift mechanism.

22. A typewriting machine comprising two sets of types and a case-shift mechanism; one of said sets of types constructed and arranged to make groupings of characters or logograms, and effective when said case-shift mechanism is in one position, and the other of said sets of types comprising substantially the Roman alphabet, and effective when the case-shift mechanism is in the other position; and a letter-feeding mechanism having a shiftable part connected to the case-shift mechanism to render the letter-feeding mechanism ineffective when the case-shift mechanism is in the first-mentioned position.

23. The combination of a carriage, two sets of types, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement between said universal bar and said letter-feeding mechanism, and means connecting said interponent to said case-shift mechanism to withdraw the interponent when the case-shift mechanism moves to one of its positions.

24. The combination of a carriage, two sets of types, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement between said universal bar and said letter-feeding mechanism, means connecting said interponent to said case-shift mechanism to withdraw the interponent when the case-shift mechanism moves to one of its positions, and a ribbon-vibrating mechanism connected to said universal bar to operate at both positions of the case-shift mechanism.

25. The combination of keys, including a special character key, types connected to said keys, a platen, letter-feeding mechanism, case-shift mechanism, means connecting said case-shift mechanism to said letter-feeding mechanism to silence the latter when the case-shift mechanism is in one of its positions, and means connected to said special character key for silencing said letter-feeding mechanism at the operation of said special character key when the case-shift mechanism is in the other of its positions.

26. The combination of a carriage, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement between said universal bar and said letter-feeding mechanism, means connecting said interponent to said case-shift mechanism to withdraw the interponent when the case-shift mechanism moves to one of its positions, and types of one language effective at one and types of another language effective at another of the case-shift positions.

27. The combination of a platen, letter-feeding mechanism, case-shift mechanism, a set of keys including special keys, types connected to said keys and comprising two sets, one of said sets of types constructed to write the English or analogous language and effective at one position of the case-shift mechanism, and the other of said sets of types constructed to write the Korean or analogous language and effective at the other position of said case-shift mechanism, means connecting said case-shift mechanism to said letter-feeding mechanism to silence the latter when the case-shift mechanism is in one of its positions; each of said special

keys connected to types for writing Korean characters in both positions of the case-shift mechanism; and means connected to said special keys for silencing said letter-feeding mechanism at the operation of said special keys when the case-shift mechanism is in position for writing English.

28. A typewriting machine having two sets of types, keys f operating the types, letter-feeding mechanism silenced when one set of types is being printed, but effective when the other types are being printed, ribbon-vibrating mechanism effective when all the types are being printed, a single universal bar between all said keys and both mechanisms, and an interponent connected to be made effective by one set of types only.

29. A typewriting machine having a group of keys, two groups of types, both of which sets of types are operable by said keys, and letter-feeding mechanism silenced when any one of said keys is operated to print a type in one group but effective when the same key is operated to print a type in the other group.

30. A typewriting machine having two sets of types, keys for operating the types, letter-feeding mechanism silenced when the types of one set are being printed, but effective when the other types are being printed; said machine including a key for effecting letter-spacing movements independently of the type keys, and a key for effecting two letter-spacing movements at each operation thereof.

31. A typewriting machine having a case-shift mechanism and having types for writing in one language at one position of the case-shift mechanism, and in a different language at another position of the case-shift mechanism, keys for controlling said types, letter-feeding mechanism operable by the keys only when writing one of said languages and not the other, and a ribbon-vibrating mechanism operable by the keys at all times.

32. A typewriting machine having a case-shift mechanism and also having type-operating or controlling keys, and a letter-feeding mechanism operable by the keys at one position of said case-shift mechanism, but inoperable by the same keys at another position of said case-shift mechanism, a ribbon-vibrating mechanism, a single universal bar operable by all said keys and adapted to operate both the letter-feeding and ribbon-vibrating mechanisms, said universal bar being arranged to operate the ribbon-vibrating mechanism at both positions of the case-shift mechanism, and means connected to said case-shift mechanism to determine when the letter-feeding mechanism shall be effective for operation by said universal bar.

33. A typewriting machine provided with key-operated types so arranged with reference to the printing point, that consonant and vowel types will strike one by the side of another in the same subdivision of the writing line, and having a letter-feeding mechanism inoperable by the keys when operating said types whereby groupings or sub-groupings may be effected or logograms written by said types, a key for operating said letter-feeding mechanism, a set of types to write a different language, means effective when the last-mentioned types are being used, for operating the letter-feeding mechanism at every type stroke, and a ribbon-vibrating mechanism effective when either set of types is being used.

34. A typewriting machine having a case-shift mechanism, a group of type-bars carrying Korean types for printing at one position of the case-shift mechanism and English or Roman alphabet types for printing at another position of the case-shift mechanism, each type-bar carrying a Korean and a Roman type, the Roman type being set in natural position, and the Korean type being set crosswise thereto or in cumbent position, keys connected to said type-bars and bearing both English and Korean characters, the Korean characters being shown on said keys in their upright or natural positions, letter-feeding mechanism effective in that position of the case-shift mechanism in which the Roman alphabet is printed but ineffective in the case-shift position when the Korean types are printed, and a ribbon-vibrating mechanism operable by the keys in both positions of the case-shift mechanism.

35. A typewriting machine having a case-shift mechanism and provided with different sets of types for use in different positions of the case-shift mechanism, the types in one set being arranged in natural positions, and those in the other set being crosswise thereto, whereby when using the first set the lines run across the page one line under another upon a work-sheet introduced head first into the machine, and when using the second set the lines run down the page by the side of one another upon a work-sheet introduced side-foremost into the machine, the types in the second set being capable of writing in various positions relatively to one another to make groupings or logograms; automatic letter-feeding mechanism effective only when the types in the first set are being printed, and a ribbon-vibrating mechanism effective when either set of types is being used.

36. A typewriting machine having a case-shift mechanism and provided with different sets of types for use in different positions of the case-shift mechanism, the types in one set being arranged in natural positions, and those in the other set being cross-

wise thereto, whereby when using the first set the lines run across the page one line under another upon a work-sheet introduced head first into the machine, and when using the second set the lines run down the page by the side of one another upon a work-sheet introduced side-foremost into the machine, the types in the second set being capable of writing in various positions relatively to one another to make groupings or logograms, automatic letter-feeding mechanism effective only when the types in the first set are being printed, a letter-feeding space-key, an additional space-key having means for producing a double letter-feeding movement, and a ribbon-vibrating mechanism effective when either set of types is being used.

37. A typewriting machine comprising a case-shift mechanism, letter-feeding mechanism, a ribbon-vibrating mechanism, and a single universal bar for operating both the letter-feeding mechanism and the ribbon-vibrating mechanism; said ribbon-vibrating mechanism being effective for operation by said universal bar at both positions of the case-shift mechanism, and said letter-feeding mechanism including a shiftable member which is directly operable by said universal bar and is conected to said case-shift mechanism to be rendered effective for such operation at one position of the case-shift mechanism, and to be rendered ineffective at the other position of said case-shift mechanism.

38. A typewriting machine comprising two sets of types and a case-shift mechanism; one of said sets of types constructed and arranged to make groupings of characters or logograms, and effective when said case-shift mechanism is in one position, and the other of said sets of types comprising substantially the Roman alphabet, and effective when the case-shift mechanism is in the other position; a letter-feeding mechanism having a shiftable part connected to the case-shift mechanism to render the letter-feeding mechanism ineffective when the case-shift mechanism is in the first-mentioned position; and a ribbon-vibrating mechanism effective at both positions of the case-shift mechanism.

39. The combination of a carriage, two sets of types, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement between said universal bar and said letter-feeding mechanism, means connecting said interponent to said case-shift mechanism to withdraw the interponent when the case-shift mechanism moves to one of its positions, and a ribbon-vibrating mechanism operated by said universal bar.

40. The combination of a carriage, two sets of types, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement from said universal bar to said letter-feeding mechanism, means connected to said case-shift mechanism to render the movement-transmitting interponent ineffective when the case-shift mechanism moves to one of its positions, and a ribbon-vibrating mechanism connected to said universal bar.

41. The combination of keys, including a special character key, types connected to said keys, a platen, letter-feeding mechanism, case-shift mechanism, means connecting said case-shift mechanism to said letter-feeding mechanism to silence the latter when the case-shift mechanism is in one of its positions, means connected to said special character key for silencing said letter-feeding mechanism at the operation of said special character key when the case-shift mechanism is in the other of its positions, and a ribbon-vibrating mechanism effective at all operations of all the type keys.

42. The combination of a carriage, a case-shift mechanism, a letter-feeding mechanism, a universal bar, an interponent to transmit movement between said universal bar and said letter-feeding mechanism, means connecting said interponent to said case-shift mechanism to withdraw the interponent when the case-shift mechanism moves to one of its positions, types of one language effective at one and types of another language effective at another of the case-shift positions, and a ribbon-vibrating mechanism effective at both positions of the case-shift mechanism.

43. The combination of a platen, a letter-feeding mechanism, case-shift mechanism, a set of keys including special keys, types connected to said keys and comprising two sets, one of said sets of types constructed to write the English or analogous language and effective at one position of the case-shift mechanism, and the other of said sets of types constructed to write the Korean or analogous language and effective at the other position of said case-shift mechanism, means connecting said case-shift mechanism to said letter-feeding mechanism to silence the latter when the case-shift mechanism is in one of its positions; each of said special keys connected to types for writing Korean characters in both positions of the case-shift mechanism; means connected to said special keys for silencing said letter-feeding mechanism at the operation of said special keys when the case-shift mechanism is in position for writing English; and a ribbon-vibrating mechanism effective at all operations of all of the type keys.

44. In a typewriting machine, the combination with a traveling carriage, different sets of types, and a case-shift mechanism

for determining which set of types shall be effective, of letter-feeding devices for said carriage, type-operating keys, a ribbon vibrator, a single universal bar for operating said ribbon vibrator and said letter-feeding devices, and means connected to said case-shift mechanism for rendering the letter-feeding devices effective for operation by said universal bar in one position of the case-shift mechanism and ineffective for such operation in the other position thereof.

45. In a typewriting machine for writing a language of which the characters normally stand upright, the combination of a system of types mounted in cumbent positions to make cumbent impressions on the work-sheet, a carriage, a rotatable platen thereon, a letter-feed device for causing said impressions to succeed one another in cumbent positions along said platen, so that the printed characters have their vertical axes parallel to the axis of the platen, and platen-rotating means for line-spacing the work-sheet across said vertical axes of said characters.

46. In a typewriting machine for writing a language of which the characters stand upright, the combination of a series of types mounted in cumbent positions to make cumbent impressions on the work-sheet, keys for said types, a carriage, a rotatable platen thereon, a letter-feeding device for causing said type impressions to succeed one another in cumbent positions along said platen so that the printed characters have their vertical axes parallel to the axis of the platen, platen-rotating means for line-spacing a work-sheet across said vertical axes of said characters, and a separate set of types also operated by said keys adapted to print on said platen with their vertical axes transverse to the letter-feeding devices and parallel to the line-spacing movement of the platen.

47. In a typewriting machine for writing a language of which the characters normally stand upright, the combination of a system of types mounted in cumbent positions to make cumbent impressions on the work-sheet, keys for said types, a carriage, a rotatable platen thereon, a letter-feeding device causing said impressions to succeed one another in cumbent positions along said platen so that the printed characters have their vertical axes parallel to the axis of the platen, a separate set of types also operated by said keys adapted to print characters having their vertical axes transverse to the axis of the platen, a case-shift device, a letter-feeding device for said second set of types, and means operated by said case-shift device for making said last-named letter-feeding device effective.

48. In a typewriting machine for writing a language of which the characters normally stand upright, the combination of a system of types mounted in cumbent positions to make cumbent impressions on the work-sheet, keys for said types, a carriage, a rotatable platen thereon, a letter-feeding device causing said impressions to succeed one another in cumbent positions along said platen so that the printed characters have their vertical axes parallel to the axis of the platen, a separate set of types also operated by said keys adapted to print characters having their vertical axes transverse to the axis of the platen, a case-shift device, a letter-feeding device for said second set of types, means operated by said case-shift device for making said last-named letter-feeding device effective, platen-rotating means for line-spacing the work-sheet across said vertical axes of said characters, and a ribbon-vibrating device effective for both sets of types.

49. The combination of an alphabet or system of type-writing types, a second system of typewriting types, the types in one system being formed integral with the types in the other system, and the vertical axes of the types in one system being at right angles to the corresponding axes of the types in the other system, and means for effecting letter-feeding movements in a direction parallel with the axes of the types in one type system and at right angles to the axes of the types in the other system.

50. A typewriting machine constructed to write a language in which the lines of writing run down the page, comprising an alphabet of cumbent types mounted to make cumbent imprints upon the sheet, means for producing relative letter-feeding movements between the types and the page in the direction of the vertical axes of the cumbent types when in printing position, whereby the types may follow one under another, and means for effecting line-feeding movements in a direction at right angles to the direction of said axes.

51. A typewriting machine constructed to write a language in which the lines of writing run down the page, comprising an alphabet of cumbent types mounted to make cumbent imprints upon the sheet, means for producing relative letter-feeding movements between the types and the page in the direction of the vertical axes of the cumbent types when in printing position, whereby the types may follow one under another, means for effecting line-feeding movements in a direction at right angles to the direction of said axes, and keys connected to said types, said keys bearing the characters in upright positions.

52. In a typewriting machine for writing a foreign language, the combination of a set of type-sections of a single character, said sections mounted to strike at the same printing point, whereby imprints of said sections

would be superposed, and mechanism for effecting relative movement between the work-sheet and types to the extent necessary to enable said sections to make their imprints in proper relative positions, to make, by their combination, a single character upon the work-sheet.

53. In a typewriting machine for writing a foreign language, the combination of a set of type-sections of a single character, said sections mounted to strike at the same printing point, whereby imprints of said sections would be superposed, and mechanism for effecting relative movement between the work-sheet and types to the extent necessary to enable said sections to make their imprints in proper relative positions, to make, by their combination, a single character upon the work-sheet, said movement-effecting mechanism being operable independently of said type-sections.

54. In a typewriting machine for writing a foreign language employing characters, the combination with complete types, and sets of type-sections for writing different characters, said sections and said complete types mounted to strike in cumbent positions at the same printing point, whereby imprints of said sections would be superposed on the work-sheet, of mechanism for effecting relative movement between the work-sheet and the types in the direction of the vertical axes of the imprints, to the extent necessary to enable said sections to make their imprints in proper relative positions, to make, by their combinations, different cumbent characters on the work-sheet.

55. In a typewriting machine for writing a foreign language employing characters, the combination of a system of types including different sets of type-sections, for writing different characters, each set of type-sections coöperative to write a single character, the sections in all the sets mounted to strike at the same printing point, whereby the imprints of the sections in each set would be made one upon another, and mechanism for effecting step-by-step movement between the work-sheet and the types, the extent of such step-by-step movement agreeing with the relative displacement which it is necessary to produce between the imprints of the sections in each set, in order to enable said imprints to combine to make a single multiple-space complete character on the work-sheet.

56. In a typewriting machine for writing a foreign language employing characters, the combination of a system of types including complete units and also including different sets of type-sections, for writing different characters, each set of type-sections coöperative to write a single character, the sections in all the sets mounted to strike at the same printing point, whereby the imprints of the sections in each set would be made one upon another, and mechanism for effecting step-by-step movement between the work-sheet and the types in the direction of the vertical axes of the characters, to cause the imprints to follow one another down the page, the extent of such step-by-step movement agreeing with the relative displacement which it is necessary to produce between the imprints of the sections in each set, in order to enable said imprints to combine to make a single multiple-space complete character on the work-sheet, such step-by-step movement being also sufficient in extent for the letter-spacing of each of said complete units.

57. In a typewriting machine for writing a foreign language employing characters, the combination with means for holding a sheet introduced sidewise into the machine, of a system of cumbent types including different sets of type-sections for writing different characters in cumbent positions, each set of type-sections coöperative to write a single character, the sections in all the sets mounted to strike at the same printing point, whereby the imprints of the sections in each set would be made one upon another, mechanism for effecting step-by-step movement between the work-sheet and the types in the direction of the vertical axes of the cumbent types when in printing position, to make a line of writing extending down the page, the extent of such step-by-step movement agreeing with the relative displacement which it is necessary to produce between the imprints of the sections in each set, in order to enable said imprints to combine to make a single character on the work-sheet, and means for line-feeding the sheet in a direction transverse to said vertical axes.

58. In a typewriting machine for writing foreign languages employing a series of characters, the combination of types, including a series of sets of type-sections for making a series of different characters, the sections in each set capable of producing a single character, and said sections all mounted to strike at a common printing point, independently operable keys for operating said types, and a key independent of said keys and free of connection with any type, for effecting relative movement between the work-sheet and types to the extent necessary to enable the sections in the different sets to make their successive imprints in proper relative positions, to make, by their combinations, the desired characters upon the work-sheet.

59. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral

with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point.

60. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point; and means for effecting relative step-by-step movements between the work-sheet and the types, for letter-feeding when writing said modern language.

61. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point; means operable by the type keys for effecting relative step-by-step movements between the work-sheet and the types, for letter-feeding when writing said modern language, and means for enabling said type-sections to make their imprints in proper relative positions on the work-sheet, to make, by their combinations, the desired complete characters upon the work-sheet.

62. A typewriting machine comprising types for a modern language employing unitary letters derived from the Phenician alphabet, and also comprising type-sections for an agglutinative or other language employing built-up characters, the types in one language being formed integral with the type-sections in the other language, and the type-sections mounted to strike at the same printing point, the vertical axes of the types of said Phenician language being crosswise of the corresponding axes of the types in said other language.

63. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point, means operable by the type keys for effecting relatively step-by-step movements between the work-sheet and the types, for letter-feeding when writing said modern language, and means for enabling said type-sections to make their imprints in proper relative positions on the work-sheet, to make, by their combinations, the desired complete characters upon the work-sheet, the vertical axes of the types of said Phenician language being crosswise of the corresponding axes of the types in said other language.

64. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point, keys for operating all of said types, and means operable by the type-keys when writing said Phenician language to effect relative letter-feeding movements between the work-sheet and the types.

65. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point, means for enabling said type-sections to make their imprints in proper relative positions on the work-sheet, to make, by their combinations, the desired complete characters upon the work-sheet, the vertical axes of the types of said Phenician language being crosswise of the corresponding axes of the types in said other language, keys for operating all of said types, and means operable by the type-keys when writing said Phenician language to effect relative letter-feeding movements between the work-sheet and the types.

66. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same point, means for enabling said type-sections to make their imprints in proper relative positions on the work-sheet, to make by their combinations, the desired complete characters upon the work-sheet, the vertical axes of the types of said Phenician language being crosswise of the corresponding axes of the types in said other language, keys for operating all of said types, means operable by the type-keys when writing said Phenician language to effect relative letter-feeding movements between the work-sheet and the types, and

means for preventing the type-keys from effecting such relative movements only when writing said characters.

67. A typewriting machine constructed to write a modern language employing unitary letters derived from the Phenician alphabet, and also to write an agglutinative or other language employing built-up characters, the types in one language being formed integral with the types in the other language, and the types for writing said characters comprising sets of type-sections mounted to strike at the same printing point, keys for operating all of said types, means operable by the type-keys when writing said Phenician language to effect relative letter-feeding movements between the work-sheet and the types, and a separate key free of connection with any type, for effecting such relative movements, for the purpose of enabling such type-sections to build up the various complete characters on the work-sheet.

68. A typewriting machine comprising a set of whole types for one language formed crosswise to and integral with a set of type-sections for another language, said type-sections mounted to strike at the same printing point, means for enabling said type-sections to make their imprints in proper relative positions on the work-sheet, to make, by their combinations, the desired complete characters upon the work-sheet, keys common to said whole types and type-sections, means operable by the type keys when operating said whole types to effect letter-feeding movements, means for preventing the type keys from effecting letter-feeding movements only when operating said type-sections, and a separate key free of connection with any type-section, for effecting letter-feeding movements, for the purpose of enabling such type-sections to build up the various complete characters on the work-sheet.

69. In a typewriting machine for writing a foreign language employing built-up characters, the combination of a system of types including different sets of type-sections, for writing different complete characters, each set of type-sections coöperative to write a single complete character, the sections in all the sets mounted to strike at the same printing point, whereby the imprints of the sections in each set would be made one upon another, keys to operate said types, and means inoperable by said keys for effecting step-by-step movement between the work-sheet and the types, to enable the imprints to combine to make a single multiple-space complete character on the work-sheet.

70. In a typewriting machine for writing a foreign language employing built-up characters, the combination of a system of types including different sets of type-sections, for writing different complete characters, each set of type-sections coöperative to write a single complete character, the sections in all the sets mounted to strike at the same printing point, whereby the imprints of the sections in each set would be made one upon another, and mechanism for effecting step-by-step movement between the work-sheet and the types, to produce the relative displacement which is necessary between the imprints of the sections in each set, in order to enable said imprints to combine to make a single multiple-space complete character on the work-sheet, said relative movement between the work-sheet and the types being so great in comparison to the sizes of the types as to leave a slight clear space between the sub-groups or syllables of the word.

71. In a typewriting machine, the combination with means for holding a work-sheet, of means for writing thereon at will in either agglutinative characters or Phenician alphabetical characters, said writing means comprising sets of key-operated type-sections mounted to make their imprints at the same printing point, means ineffective at the type impressions for effecting relative movement between the work-sheet and the types to enable said type-sections to build up multiple-space complete agglutinative characters, and also comprising key-operated means for writing said alphabetical language upon the same work-sheet, and means operating automatically for effecting relative letter-feeding movements between the types and the work-sheet when writing said alphabetical characters.

72. In a typewriting machine, the combination with means for holding a work-sheet, of means for writing thereon at will in either agglutinative characters or Phenician alphabetical characters, said writing means comprising sets of key-operated type-sections mounted to make their imprints at the same printing point, means ineffective at the type impressions for effecting relative movement between the work-sheet and the types, to enable said type-sections to build up multiple-space complete agglutinative characters, and also comprising key-operated means for writing said alphabetical language upon the same work-sheet, means operating automatically for effecting relative letter-feeding movements between the types and the work-sheet when writing said alphabetical characters, and shiftable means for bringing into use either said alphabetical characters or said agglutinative type-sections to write either language at will.

73. In a typewriting machine, the combination with means for holding a work-sheet, of means for writing thereon at will in either agglutinative characters or Phenician alphabetical characters, said writing means comprising sets of key-operated type-sec-

tions mounted to make their imprints at the same printing point, means ineffective at the type impressions for effecting relative movement between the work-sheet and the types, to enable said type-sections to build up multiple-space complete agglutinative characters, and also comprising key-operated means for writing said alphabetical language upon the same work-sheet, shiftable means for bringing into use either said alphabetical characters or said agglutinative type-sections to write either language at will, a letter-feeding mechanism, and means controlled by said shiftable means for rendering the letter-feeding mechanism effective when said alphabetical types are employed and ineffective when said agglutinative characters or sections are being employed.

74. In a typewriting machine, the combination with means for holding a work-sheet, of means for writing thereon at will in either agglutinative characters or Phenician alphabetical characters, said writing means comprising sets of key-operated type-sections mounted to make their imprints at the same printing point, means ineffective at the type impressions for effecting relative movement between the work-sheet and the types, to enable said type-sections to build up multiple-space complete agglutinative characters, and also comprising key-operated means for writing said alphabetical language upon the same work-sheet, shiftable means for bringing into use either said alphabetical characters or said agglutinative type-sections to write either language at will, a letter-feeding mechanism, means controlled by said shiftable means for rendering the letter-feeding mechanism effective when said alphabetical types are employed and ineffective when said agglutinative characters or sections are being employed, and means effective when any of said alphabetical or said agglutinative types are employed for interposing a ribbon between the types and the paper at the printing strokes.

75. The combination with sheet-holding means, type-operating keys, letter-feeding mechanism operable thereby, and ribbon-vibrating means also operable by said keys, of shiftable means for rendering said letter-feeding mechanism inoperative at all the type-key strokes, and a key free of connection with all of the types for effecting letter-feed movements.

76. In a typewriting machine, the combination with means for holding a work-sheet, of means for writing thereon in either an agglutinative language or a modern alphabetical language, comprising sets of key-operated type-sections mounted to make their imprints at the same printing point, means for effecting relative movement between the work-sheet and the types, to enable said types to build up multiple-space complete characters, and key-operated means for writing said alphabetical language upon said work-sheet.

77. In a typewriting means, a set of type blocks having thereon two systems of types, one of said systems being alphabetical and based on the Phenician alphabet, and the other of said systems comprising sections of complete characters of an agglutinative language, one of said sections on the same type-block with each of said Phenician alphabet types, and all of said sections mounted to strike at a common printing point.

78. In a typewriting machine, a set of type blocks having thereon two systems of types, one of said systems being alphabetical and based on the Phenician alphabet, and the other of said systems comprising sections of complete characters of an agglutinative language, one of said sections on the same type-block with each of said Phenician alphabet types, and all of said sections mounted to strike at a common printing point, in combination with means for effecting relative movement between the type-sections and the work-sheet, to enable said sections to combine to build up the required characters on the work-sheet.

79. In a typewriting machine, a set of type blocks having thereon two systems of types, one of said systems being alphabetical and based on the Phenician alphabet, and the other of said systems comprising sections of complete characters of an agglutinative language, one of said sections on the same type-block with each of said Phenician alphabet types, and all of said sections mounted to strike at a common printing point, in combination with letter-feeding devices operable at will independently of the types for effecting relative movement between the type-sections and the work-sheet, to enable said sections to combine to build up the required characters on the work-sheet, and means operable automatically at the imprints of said Phenician alphabet types, for effecting the required letter-feeding movements.

80. A typewriter for a foreign language comprising means to hold a work-sheet, and also comprising means to write the characters up a said work-sheet, said writing means being so constructed that the work-sheet must be inserted sidewise into the machine, said writing means and said work-sheet holding means being relatively so mounted that the characters will be printed upon said sheet in cumbent positions, and said machine also comprising letter-feeding means constructed to effect relative movement between the work-sheet and the printing means to cause the head of each successive character to succeed the foot

of the preceding character, so that when a sheet is withdrawn from the machine and turned around to bring the characters to normal upright positions, the lines will read down the page.

81. A typewriter for a foreign language comprising means to hold a work-sheet, and also comprising means to write the characters upon said work-sheet, said writing means being so constructed that the work-sheet must be inserted sidewise into the machine, said writing means and said work-sheet holding means being relatively so mounted that the characters will be printed upon said sheet in cumbent positions, and said machine also comprising letter-feeding means constructed to effect relative movement between the work-sheet and the printing means vertically of the types, to cause the head of each successive character to succeed the foot of the preceding character, so that when a sheet is withdrawn from the machine and turned around to bring the characters to normal upright positions the characters will appear as letter-spaced vertically, so that the lines will read down the page: said machine also including means for effecting a relative line-spacing movement between the work-holding means and the printing means in a direction sidewise of the work-sheet.

82. In a typewriting machine, the combination with cumbent types and a platen, of a carriage, and means for letter-feeding said carriage vertically of the types, so that the types print one below another in a line extending from left to right, with the result that when the sheet is removed from the machine, the operative will read the line written from top to bottom with the sheet turned at right angles to the direction in which it was written on said sheet.

83. In a typewriting machine having a keyboard, the combination with a platen and cumbent types mounted for printing thereon in a manner to make the imprints appear in cumbent positions to the operative at the keyboard, a carriage, means for letter-feeding said carriage vertically of the types, to cause the cumbent devices printed by said types on said platen to follow one below the other, and line-space devices for causing relative movement between said platen and the printing point in a direction laterally of the types, to cause successive lines of writing, when removed from the machine and turned to their natural positions, to be readable beginning at the upper right-hand corner and reading downwardly, each line in succession after the one next to the right thereof.

84. In a machine for writing in an agglutinative language, the combination with a series of key-operated cumbent type-sections, said type-sections mounted to strike in the same place, of a carriage, means independent of said type-sections for letter-feeding said carriage in a direction longitudinal of the axes of the types, whereby the type impressions will be letter-spaced one under another on the work-sheet, and a key for effecting a double letter-feed movement of the carriage, so as to simultaneously effect spacing of a type-section and secure a blank space between words.

85. In a typewriting machine, the combination with a traveling carriage and an escapement therefor, of a shiftable device for making said escapement effective, a case-shift mechanism, and means connected to be operated by said case-shift mechanism for making said shiftable device effective.

86. In a typewriting machine, the combination with a movable paper holder, of an escapement therefor, including a rocker provided with an extension, printing means, a rock shaft provided with an arm engageable with said extension both during the forward and the return movements of the shaft to impart a double movement to the rocker, and a key connected to said shaft to operate the same.

87. In a typewriting machine, the combination with a movable paper holder, of an escapement therefor, including a rocker provided with an extension, printing means, a pair of separate rock shafts each provided with an arm engageable with said extension to operate the rocker, one of said arms being adapted to shift said extension both during the forward and the return movements of the corresponding rock shaft to impart a double movement to the rocker, and a key individual to each rock shaft to operate the same.

88. In a typewriting machine, the combination with a movable paper holder, of an escapement therefor, escapement-operating means, a shiftable member between said escapement and said operating means to control the effectiveness of the latter to operate the former, means tending to normally hold said shiftable member in effective position with relation to said operating means, a rocking element for moving said member into ineffective position, and means for actuating said rocking element.

89. In a typewriting machine, the combination with a movable paper holder, of an escapement therefor, escapement-operating means, a shiftable member between said escapement and said operating means to control the effectiveness of the latter to operate the former, means tending to normally hold said shiftable member in effective position with relation to said operating means, a rocking element having an arm engageable with said shiftable member to depress the same into ineffective position, and means for actuating said rocking element.

90. In a typewriting machine, the combination with a traveling carriage, an escapement therefor, and a case-shift mechanism, of escapement-operating means, a shiftable member between said escapement and said operating means to control the effectiveness of the latter to operate the former, means tending to normally hold said shiftable member in effective position with relation to said operating means, means connected to the case-shift mechanism and to said holding means to move said shiftable member into ineffective position when said case-shift mechanism is in one position, and key-actuated means to move said shiftable member into ineffective position when the case-shift mechanism is in its other position.

91. A typewriting machine having a group of keys, two groups of types, both of which groups of types are operable by said keys, letter-feeding mechanism silenced when any one of said keys is operated to print a type in one group but effective when the same key is operated to print a type in the other group, additional groups of types, and additional keys each common to a type in each of said additional groups, said letter-feeding mechanism being silenced when said additional keys are operated to print types in either of said additional groups.

J FRANK ALLARD.

Witnesses:

TITUS H. IRONS,

F. E. ALEXANDER.