No. 714,621. Patented Nov. 25, 1902.

B. P. TCHERKASSOV & R. E. HILL.

TYPE FOR TYPE WRITING OR PRINTING.

(Application filed Nov. 21, 1900.)

(No Model.)

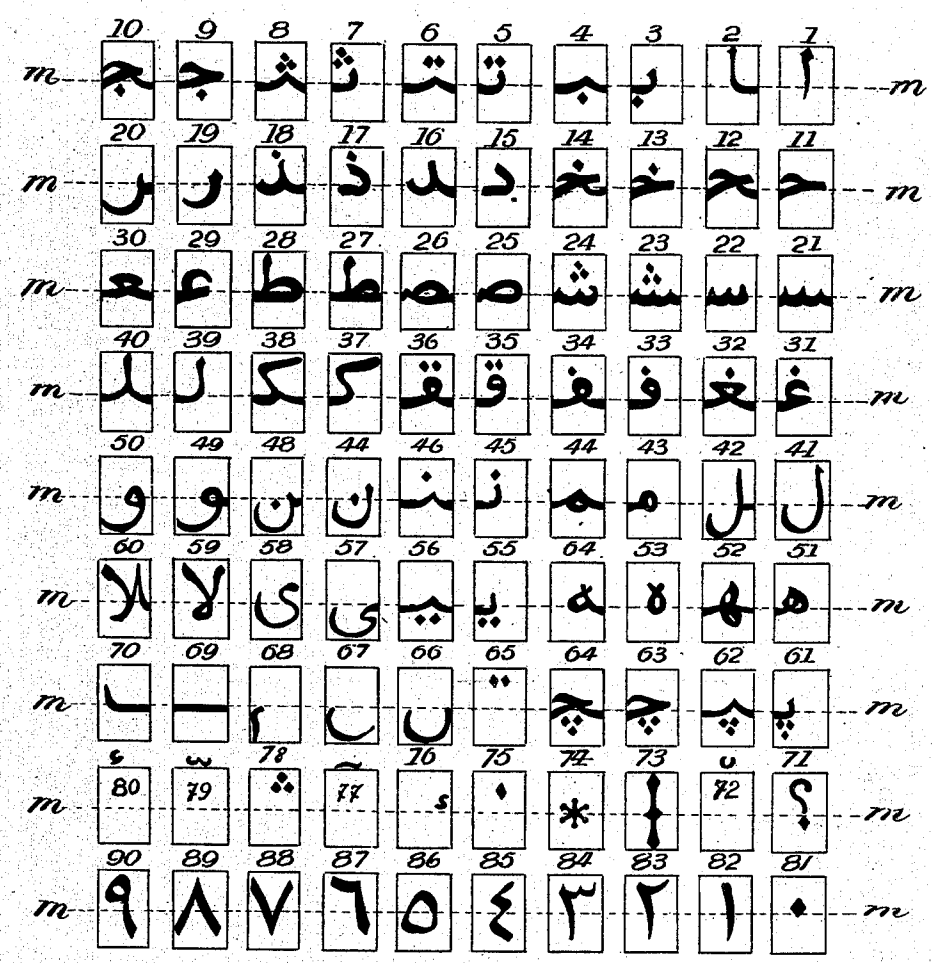


Fig. 1.



Fig. 2.



Fig. 3



Fig. 4.

WITNESSES:

L. C. Hills

Edwin King Lindy

INVENTORS

Baron Paul Tcherkassov

Robert Ervin Hill

BY Awellsbrick his Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BARON PAUL TCHERKASSOV, OF ST. PETERSBURG, RUSSIA, AND ROBERT ERWIN HILL, OF CHICAGO, ILLINOIS.

TYPE FOR TYPE-WRITING OR PRINTING.

SPECIFICATION forming part of Letters Patent No. 714,621, dated November 25, 1902.

Application filed November 21, 1900. Serial No. 37,309. (No model.)

To all whom it may concern:

Be it known that we, BARON PAUL TCHERKASSOV, a subject of the Czar of Russia, residing at St. Petersburg, Russia, and ROBERT ERWIN HILL, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Types for Type-Writing or Printing, of which the following is a specification.

Our invention has for its object to produce really efficient and well-shaped Arabic characters in type-writing or printing in those languages—such as the Arabic, Turkish, Persian, and Hindustani—wherein the Arabic alphabet is employed, and while the novel and distinguishing features of our invention are particularly adapted for employment in the art of type-writing some of them are also applicable to the art of printing from movable types, linotypes, &c.

As we are well aware that similar attempts have heretofore been made, it is of the utmost importance in order to a clear apprehension of the distinguishing features of our improvements to bear in mind several facts which we will now state. First, the peoples of the Eastern countries employing the languages referred to are exceedingly conservative, especially with reference to the shape of the letters or characters which they employ in writing or printing, and it is therefore imperative if changes from existing methods are sought to be introduced with expectation of their adoption that there should be as little deviation from recognized standards of form as possible; second, these peoples attach much greater importance to beauty as they see it in the outlines of the characters which they employ in writing and printing than do the Western peoples, and their standards of beauty have long been well established, and departures therefrom meet with disfavor and intolerance. Having these facts in view we have selected the Naskhi style or Arabic printing as the most handsome and generally serviceable, it being an exceedingly old and well-established form or style of alphabet, and we have made our forms to conform thereto as nearly as possible. In so doing we have sought to avoid the use of compromise characters, by which we mean single characters that are intended to do duty for different forms—as initial, medial, or final—of the same letter, and also of modified characters—that is, characters which are different in shape or proportion from the standard forms—which device—the modifying of the characters—has been proposed by some in order that the different letters of the alphabet may be applied to single blocks or types of uniform size, such as are ordinarily employed in type-writing machines. As is well known, most of the letters of the Arabic alphabet are written in four different forms, accordingly as the letter is used at the beginning of a word, in the midst of a word, at the end of a word, or alone, and also that most of the letters are joined to the next adjacent letters by connection marks or bars, so that the several letters of a word constitute a logogram. While the number of characters employed in writing or printing the Arabic languages is large, at least one hundred and two being used for the twenty-nine letters of the alphabet, the variety of fundamental outlines is much less than this total number, as a limited number of appendages in the form of dots and various forms of terminal tails are used, each of these appendages being applied to or combined with two or more of the different fundamental characters to give the different values or significances to these, so that it becomes possible to make up or construct the different characters of the language with a number of printing-type much smaller than the number of characters employed. We therefore use certain fundamental characters which alone print the single letter in one form and other appendage characters which when combined in manner to be set forth with the fundamental characters produce the letters in other forms.

In Figure 1 of the accompanying drawings we have represented in series the imprints of the characters which are to be used upon a type-writer embodying our improvements. We have represented the imprints made from the type rather than the type themselves for ease and convenience in reading the letters. The oblong figures which surround the several letters and characters in this view of the

drawings represent the shape and relative size of the blocks or bodies of the types, and by this means the positions of the several characters upon their type blocks or bodies is indicated. Fig. 2 represents the isolated form of the letter "Ba." Fig. 3 represents the isolated form of the letter "Ha." Fig. 4 represents the final form of the letter "Sin."

By reference to Fig. 1 it will be seen that some of the letters extend in horizontal direction but part-way across the type-face, some being near one edge and others near the opposite edge of their respective types, and that others extend entirely across the type from edge to edge. The supplemental or appendage characters, such as represented in 65 to 70, occupy such position upon the types which bear them as their use and shape demands. From this arrangement we are enabled to conveniently form by a type-writing machine all of the forms of the several letters required in using the Arabic alphabet, which forms not only differ in shape, but also in horizontal extent, as may be seen by reference to the letter "Sin," Nos. 21 and 22, Fig. 1. When this latter is employed at the beginning of a word, the form represented at 22 is employed, a form occupying less than one space horizontally, (taking the width of a type-block as a unit.) When the letter comes in the midst of a word, the form at 21 is used, and then its length is greater than when occupying an initial position. When it occurs at the end of a word, its form is again changed and still further lengthened, as represented in Fig. 4, and this form we produce by adding to the form at 21 the appendage character 66. Again, when the letter is used alone the characters 22 and 66 are combined, and the letter then has a length intermediate between that represented in Fig. 4 and at 21 in Fig. 1. It will thus be seen that the four forms of the letter "Sin" may be produced and that each form has not only its distinct shape, but also its distinct length, and we believe that we are the first to have made it possible to accomplish this by means of a practical type-writing machine of any of the types now in common use.

In producing the types according to our invention we have observed the following rules: The types are all of uniform size (for type-writing purposes) and of the oblong shape represented in Fig. 1, the proportions of height and width being approximately as three is to two, and this proportion we have determined by taking the final form of the letter "Lam" for height and the medial form of "Ba" for width. This arrangement we have found gives the best results where beauty of outline or conformity to recognized standards of style and convenience in adapting the printing in Arabic to type-writing machines is concerned. The line of alinement of the characters is located so as to coincide with the connection-line of the letters, as is usual in Arabic print, and this line is indicated by the dotted lines *m* in Fig. 1. The exact position of each letter or character upon its type or block has been carefully worked out to insure perfect connection of the different characters used in making up a word, and the positions are represented in the drawings.

In a type-writing machine adapted for use in writing in the languages which have been hereinbefore referred to, and which might be termed a "Universal Eastern alphabet type-writer," we find that ninety characters serve all practical purposes and that any considerable reduction fom this number is attended with practical disadvantages. With this number of characters, arranged as shown in the drawings, we can print one hundred and thirty-four different letters or characters, and this is ample for use in writing in the Arabic, Turkish, and Persian languages and also for use in the Hindustani language, with the addition of a few simple characters or appendages, which may be easily applied with the pen.

In using our alphabet in type-writing certain of the letters are printed directly by a single type—as, for instance, the letter "Alif," (1 and 2.) Others are formed by the use of two types, which are struck one after the other, and to designate this manner of forming a letter we will in this specification make use of the verb "construct." Thus the isolated form of "Ba," Fig. 2, is "constructed" from the character 3, representing "Ba" in its initial form, and the appendage character 70, these two characters being struck in succession. Other letters are formed by the use of two types which are caused to print in the same space—that is to say, one character is first printed, and afterward another character prints in the same space before the paper is allowed to move forward, or, if the paper should advance it is brought back, so that the space in which the partially-formed letter appears is in printing position, when the letter may be completed by striking the character required to complete the letter. This method of forming a letter we term "making up," the terms "constructing" and "making up" being by us herein used in an arbitrary manner to distinguish between the two methods of forming the letters which have just been pointed out. As an example of a made-up letter we have in Fig. 3 represented the isolated form of the letter "Ha," this being made up from the primary character 9 and the appendage character 67.

The manner of forming the several letters of the Arabic language in their different forms may now be set forth.

Alif: This letter has two forms, an initial and isolated form and a connected form, which is also used as the final form. These two forms are produced by single characters printing directly and are designated at 1 and 2 in the drawings.

Ba: This letter has four forms, the initial and medial forms of which are printed direct by the use of characters 3 and 4, while the

isolated and final forms are constructed from characters 3 and 4 with character 70.

Ta: This letter has four forms, the initial and medial forms being printed direct by the use of characters 5 and 6 and the isolated and final forms being constructed from characters 5 and 6 with character 70.

Tha: This letter has also four forms, in the production of which the characters 7 and 8 are used alone for two forms and are used in combination with the terminal character 70 for the other two forms.

Geem: This letter has four forms, of which two are printed direct from characters 9 and 10, and two others, the isolated and final forms, are made up from characters 9 and 10 with character 67.

Ha and *Kha:* These two letters have each four forms, corresponding in the shape of their stems with the letter "Geem," but differing in the use of the single dot. The characters 11 and 12 are used in printing the letter "Ha," and 13 and 14 in printing "Kha," character 67 being used as for "Geem."

Dal: This letter is used in two forms and is printed direct by characters 15 and 16.

Thal and *Ra:* These letters each have two forms, and each form according to our invention is printed direct from a single character, 17 and 18 being used for "Thal" and 19 and 20 for "Ra."

Zain: This letter has two forms, and these are made up from characters 19 and 20, with the dot character 75.

Sin and *Shin:* These two letters each have four forms and are similar to each other in their stem formation, but differ in that three dots are arranged above the stem in the letter "Shin." Two forms of each letter are printed directly, characters 21 and 22 being used for "Sin" and 23 and 24 being used for "Shin," the final and isolated forms being constructed by combination with the character 66.

Sahd: This letter has four forms, the inital and medial being printed direct from characters 25 and 26 and the isolated and final forms constructed from characters 25 and 26 with terminal character 66.

Thahd: This letter has four forms, two of which are made up from characters 25 and 26 with the dot character 75, and two other forms—the isolated and final—which are both made up and combined, the primary characters 25 and 26 being used in combination with characters 75 and 66.

Ttah: We employ but two forms of this letter for all purposes, which are printed direct from the characters 27 and 28.

Zah: We use but two forms of this letter for all purposes, and these are made up from characters 27 and 28, with the dot character 75.

Ain: There are four forms of this letter, and two of them we print direct from the characters 29 and 30, and two make up from these characters and the appendage character 67.

Gain: There are four forms of this letter, the initial and medial forms of which are printed directly from characters 31 and 32, and the isolated and terminal forms are made up from these characters with terminal character 67.

Fa: There are four forms of this letter, all of which we produce, two by printing direct from characters 33 and 34 and two of which we construct by the use of these characters with the terminal character 70.

Khaf: What has been said with reference to letter "Fa" may be repeated with respect to this letter, except that the fundamental characters used are made as represented at 35 and 36.

Kaf: This letter has four forms, two of which we form direct from characters 37 and 38, while the other forms—the isolated and the final—are both constructed and made up, the appendage character 70 being used in the construction and the appendage 76 in the making up, these two being combined with the fundamental characters 37 and 38, respectively.

Lam: There are four forms of this letter, each of which we print direct from a single character, and such characters are represented at 39, 40, 41, and 42.

Mim: There are also four forms of this letter, two of which are printed direct by characters 43 and 44 and two are made up from characters 43 and 44 with appendage 68.

Noon: There are four forms of this letter, for the printing of which we use four separate characters, printing directly, and they are represented at 45, 46, 47, and 48.

Waw: There are two forms of this letter, which we print direct from characters 49 and 50.

Hai: There are four forms of this letter, and each form we print direct from a separate character, these being represented at 51, 52, 53, and 54.

Ya: There are four forms of this letter, and each of them we print direct from a single character, the characters being represented at 55, 56, 57, and 58.

Lam-Alif: There are two forms of this letter or combination, and they are printed direct from the characters 59 and 60. This completes the Arabic alphabet; but special forms of the letter "Ta" are sometimes needed, and these are made up by using the primary characters 53 and 54 and the single-dot character 65.

It will thus be seen that we have made provision for printing one hundred and two forms of the different letters of the Arabic language, of which sixty-two are printed direct by the use of a single printing character, sixteen are constructed, and twenty-four are made up.

So far we have described sixty primary or fundamental characters which are used each to print a single form of a letter directly and seven appendage characters. These, with a series of characters for printing figures, as

represented in the lower row of Fig. 1, the four orthographic signs most generally used for all Eastern languages—viz., "Djasm" or "Sukkan" 72, "Madda" 77, "Tashdid" or "Shadad" 79, and "Hamza" 80—the horizontal bar 69, which is sometimes used to lengthen a final character, so as to avoid too long blank spaces at the end of a line, the combination sign for parenthesis 73, the mark of interrogation 71, and the asterisk 74, are amply sufficient for use in writing Arabic.

For printing in the Turkish and Persian languages there are the following special characters required:

Pa: This letter is printed in four forms, of which two are printed direct from the characters 61 and 62, and two others are constructed from characters 61 and 62 with 70.

Tshim: There are four forms of this letter, of which two are printed from characters 63 and 64, and two are made up from these characters and the terminal appendage 67.

Zha: This letter has two forms and is made up from characters 19 and 20 and the three-dot character 78.

Gaf: Turkish "Saghyr-noon" or "mute-noon." This letter has four forms and is made up by combining the letter "Kaf" with the three-dot character 78.

In the writing of the Hindustani or Urdu languages a few special characters or marks are required; but these are so conveniently applied with the pen that we have not made any provision for them in the arrangement of characters shown.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. Types for use in writing and printing in those languages employing the Arabic alphabet, which types are of a uniform size based on the height of the final form of the letter Lam, and the width of the medial form of the letter Ba.

2. Types for use in the writing and printing of languages employing the Arabic alphabet, bearing primary characters corresponding with the initial and medial forms of the letters, and appendage characters on separate types, which, when combined with the primary characters, constitute the final and isolated forms of the letters.

3. Types for the printing of the characters of the Arabic alphabet for type-writer and other purposes, comprising the initial and medial forms of the following letters, Alif, Ba, Ta, Tha, Geem, Ha, Kha, Dal, Thal, Ra, Sin, Shin, Sahd, Ain, Gain, Fa, Khaf, Kaf, Mim, Waw, and Lam-Alif, and appendage characters 66, 67, 68, and 70 arranged to be combined with such of the said letters as have four forms, to constitute isolated and final forms.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

BARON PAUL TCHERKASSOV.
ROBERT ERWIN HILL.

Witnesses to signature of Baron Paul Tcherkassov:

H. LOVIAGUINE,
H. F. STAPLE.

Witnesses to signature of Robert Erwin Hill:

E. B. VAN WINKLE,
R. R. LAUNSBURY.