

P. DE CARSALADE DU PONT.
 WRITING MACHINE.
 APPLICATION FILED JULY 19, 1909.

1,056,321.

Patented Mar. 18, 1913.

4 SHEETS—SHEET 1.

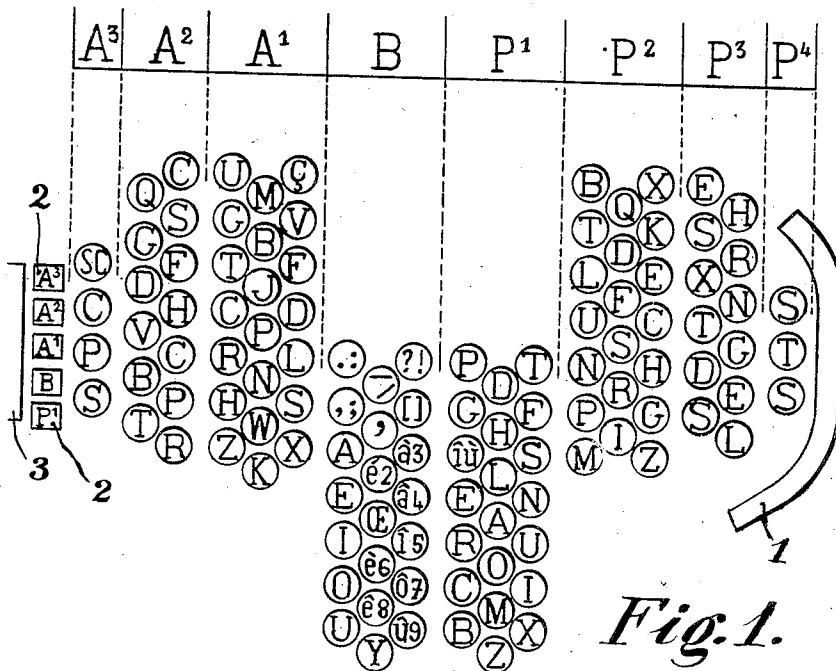


Fig. 1.

Fig. 4.

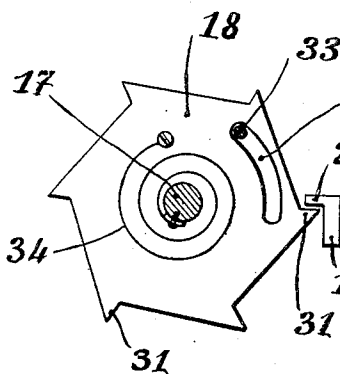
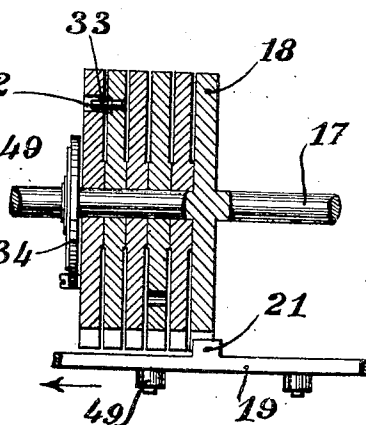


Fig. 5.



Witnesses.
Rudolf Jung
Ferdinand - Rüttig

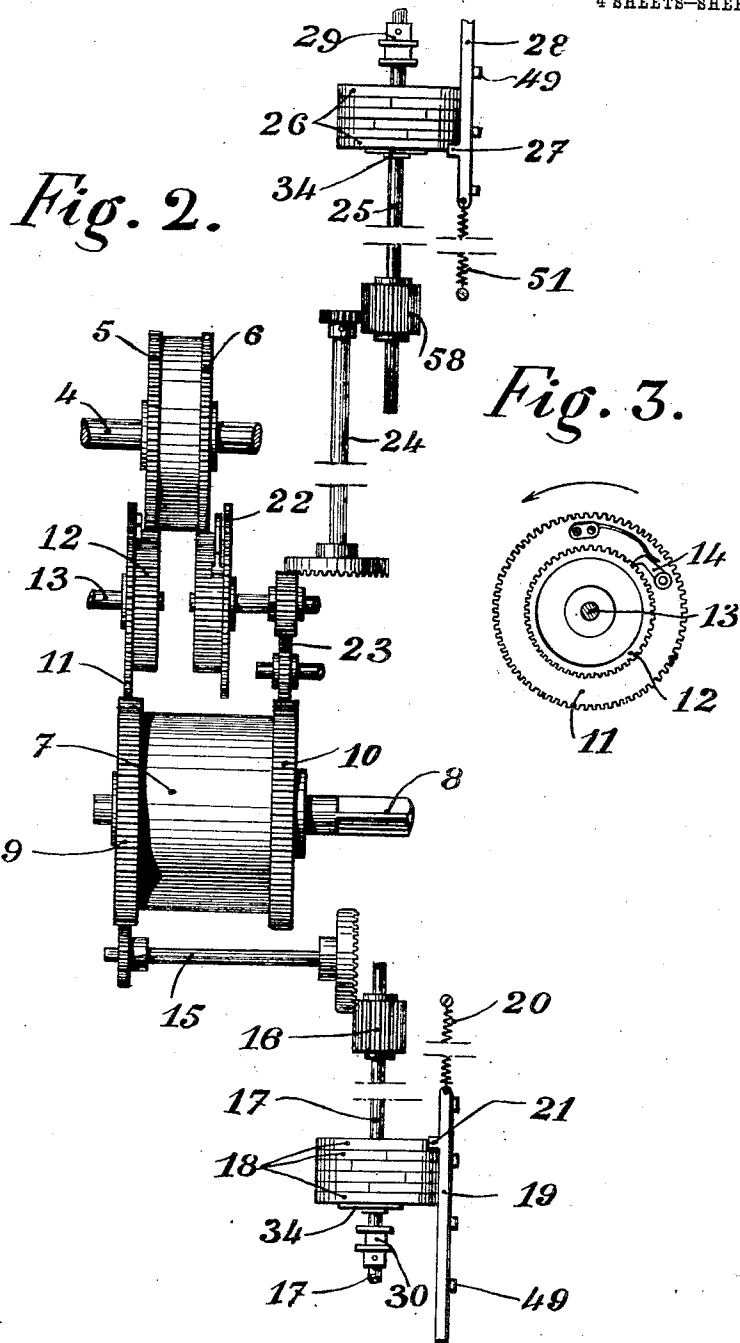
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Witnesses:
Rudolf Eger
Ferdinand Rüttger

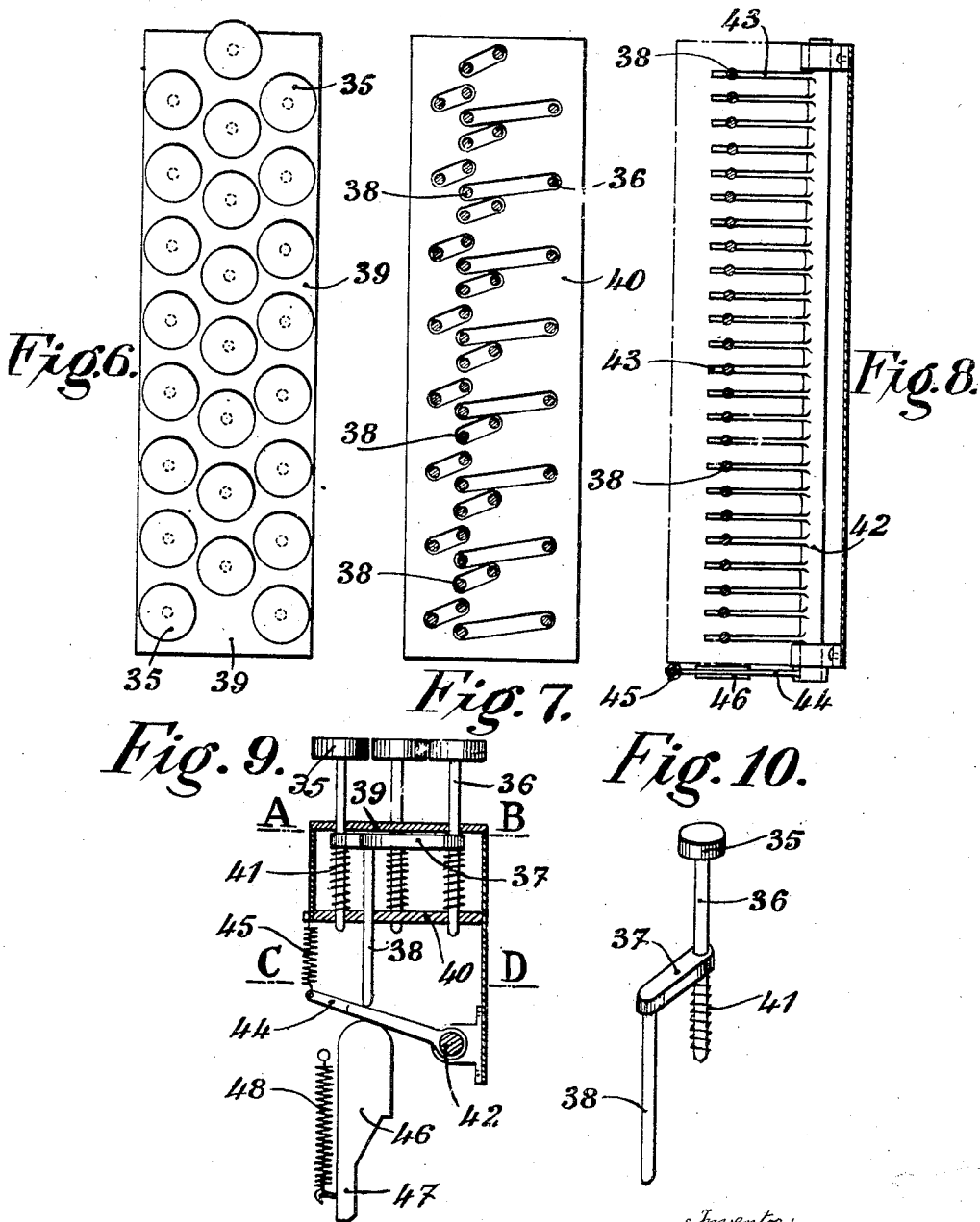
Inventor:
Paul de Carsalade du Pont
 by *Ferdinand Rüttger*
 his attorney

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4 SHEETS-SHEET 3.



Witnesses:
Rudolf Fyatt
Ferdinand Rüttger

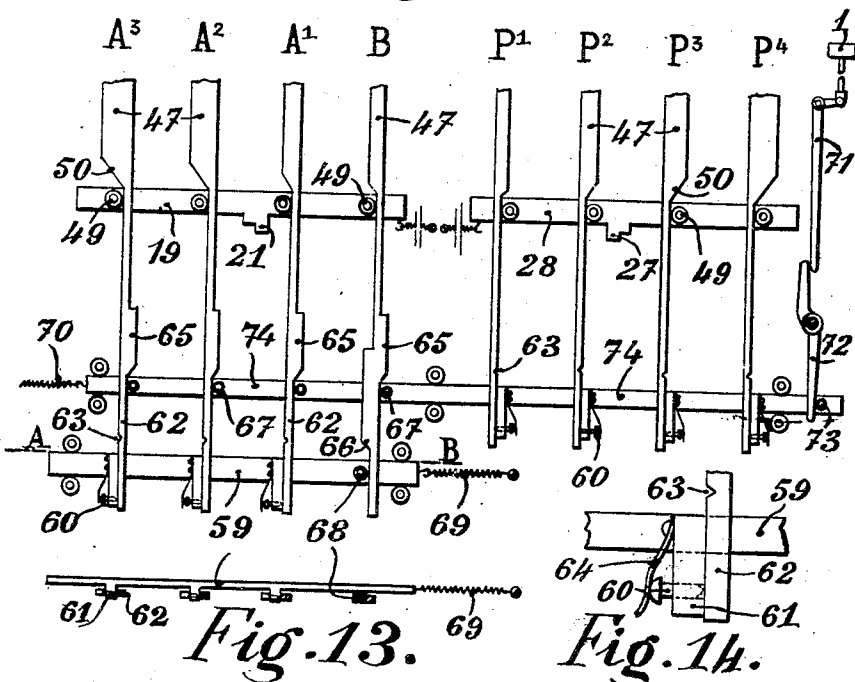
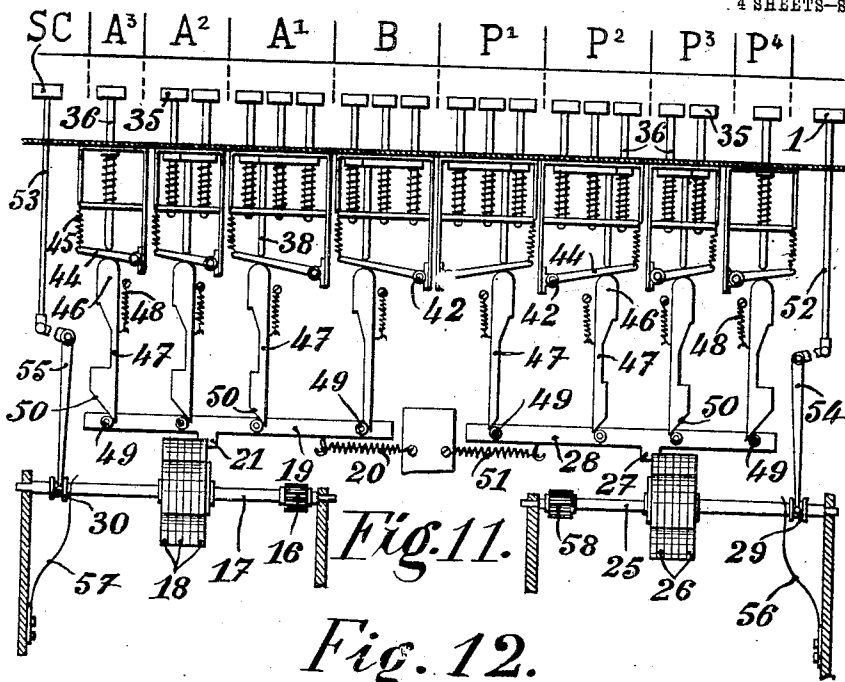
Inventor:
Paul de Carsalade du Pont
 By *Fred. M. Munn*
 his Attorney

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4 SHEETS-SHEET 4.



Witnesses:
Rudolph...
Gerdinand...

Inventor:
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 by *J. de...*
 His Attorney

UNITED STATES PATENT OFFICE.

PAUL DE CARSALADE DU PONT, OF PARIS, FRANCE, ASSIGNOR OF ONE-HALF TO
GABRIEL ESCARRAS, OF PARIS, FRANCE.

WRITING-MACHINE.

1,056,321.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed July 19, 1909. Serial No. 508,511.

To all whom it may concern:

Be it known that I, PAUL DE CARSALADE DU PONT, a citizen of the French Republic, and resident of Paris, France, have invented certain new and useful Improvements in Writing-Machines, of which the following is a specification.

This invention relates to typewriting machines, the construction of which is improved so that the speed of writing is greatly increased. With this object in view the letters of at least one syllable are printed at the same time and at the end of each word the carriage is simultaneously advanced for the required space to separate two consecutive words.

In the accompanying drawings the parts of the improved type-writer are shown which serve to explain the syllable-writing-machine.

Figure 1 represents the key-board. Fig. 2 is a ground plan representing the mechanism for driving the carriage. Fig. 3 illustrates a constructional detail of Fig. 2. Figs. 4 and 5 represent, on a larger scale, another constructional detail. Figs. 6 to 10 illustrate the arrangement of the finger keys. Fig. 11 is a diagrammatical view of the front part of the key-board mechanism. Figs. 12 and 13 show modifications of the construction illustrated in Fig. 11. Fig. 14 shows on a larger scale the lower end of the slide bars.

Every syllable can be considered as being composed of one vowel preceded and followed by a certain number of varying letters. The arrangement of these letters is governed for every language by certain rules so that certain letters always assume the same position with regard to the vowel which serves as base for the syllable. If, therefore, all the syllables of a given language, of the French language for example, be decomposed, the different letters of the alphabet can be combined in a certain number of groups so that for any syllable whatsoever the vowel which forms the base of the syllable belongs to one group, say "B", the consonant which immediately precedes the vowel belongs to a group "A¹", the letter which precedes this consonant belonging to a group "A²", and so on, while the letter which immediately follows the vowel forming the base of the syllable belongs to a

group "P¹", the next following letter to a group "P²" and so on.

Serious studies have shown that there are eight groups to be combined for any of the current languages, viz:—a group B for the vowels forming the base of the syllable, three groups A¹, A², A³ for the letters which precede the vowel and four groups P¹, P², P³, P⁴ for the letters which follow upon said vowel. If, therefore, the finger-keys of the key-board are arranged so that they form different groups of letters in the following succession:—A³, A², A¹, B, P¹, P², P³, P⁴, this key board will permit to write any syllable of any language, respectively of the language for which the machine has been constructed, in simultaneously printing all the letters which compose the said syllable. If, for example, the word "chlor" has to be typed, the keys "c" of group A³, "h" of group A², "l" of group A¹, "o" of group B and "r" of group P¹ are simultaneously depressed.

Fig. 1 represents a key-board to be used with this syllable-writing-machine. As can be seen from the drawing, the end groups A³ and P⁴ comprise very few letters only, group A³ comprising a composite letter "Sc" destined for use with the German language only. Groups A² and P³ comprise each a dozen letters and the three middle groups A¹, B and P² about twenty letters each. There can evidently be comprised vowels in every group, as for example the vowel "U" of group A¹ is necessary for writing the French word "que," "quand" and others in which the base-vowels are "e" and "a" respectively which are the sounding or pronounced vowels. The same remark refers to the "P" groups. To type, for example the French word "raient" in which "a" is the base-vowel, there has to be an "i" in group P¹ and an "e" in group P². There can further be repeated several times one and the same letter in one and the same group as for example "C" in group A², this letter immediately preceding a great number of the letters which are contained in group A¹, so that two letters "Cc" had to be included in group A² for facilitating the manipulation, so that the typist can use in every case the key which is the most convenient for being depressed simultaneously with the corresponding letter of group A¹.

The keys of group B are to be depressed by the thumb of the left hand and the keys of group P¹ by the thumb of the right hand, the other fingers being used in normal order for the groups A¹, A², A³ and P², P³, P⁴ so that the two little fingers are free; the little finger of the right hand serves to manipulate the space key 1 for the spacing of the words, the little finger of the left hand being used for operating one of the five keys 2 for shifting the types of the corresponding group to print in capitals. The group B comprises besides the six base vowels, the figures and the signs for punctuation. Finger-key 3 which is arranged at the side of the finger-keys 2 permits to simultaneously shift all the types of the machine.

To write with the improved type-writing machine, the type-levers have to be arranged so that instead of one common printing point as usual, eight printing points be juxtaposed, each of the printing points corresponding to one group of the key-board. Thus one finger-key of each group can be simultaneously depressed to simultaneously print a syllable of say eight letters. It is obvious that means have to be provided for moving the carriage in unison with the number of letters which are printed simultaneously.

Figs. 2 to 4 represent the mechanism for driving the carriage in a suitable manner. This driving mechanism is operated from shaft 4, which revolves for each finger-key depressed for a quantity which corresponds to the movement of the carriage for one space. With this object in view shaft 4 has a drum keyed upon itself which has two crowns of teeth 5 and 6 and which is connected with a cylinder 7 of double action, which is mounted on a shaft 8 and is connected thereto by a spiral spring (not shown in the drawings) which, in the well known manner drives the independent driving wheels 9 and 10 the former of which is fast on the drum while the latter is fast on the shaft 8 thereof. Such a device is known for other purposes, and the device is characterized by the two independent driving wheels 9 and 10. Wheel 9 is connected with crown 5 by means of a double wheel, which is shown in Fig. 3 in front view. This double wheel is composed of two spur wheels 11 and 12 which are loosely mounted upon shaft 13, spur-wheel 11 meshing with driving wheel 9 and spur-wheel 12 with crown 5. A pawl 14 fixed upon wheel 11 serves for dragging along the wheel 12, if wheel 11 revolves in the direction of the arrow (Fig. 2) without impeding the free rotation of wheel 12 in the same direction if wheel 11 be immobile. The driving wheel 9 of the drum further acts upon an axle 15 which by means of a pinion-gear 16 operates an axle 17 upon which an escapement 18 is keyed

which is composed of six escape wheels in front of which a slide-rod 19 is mounted which is under the influence of a spring 20 and carries a lug 21 adapted to engage with any of the six escape wheels 18, but normally being in engagement with the first of said wheels as shown in Fig. 2 preventing the rotation of the axles 17, 15 and of the wheels 9 and 11.

The slide-rod 19 is connected in a suitable manner with the finger-keys of the groups A³, A², A¹ and B so that at the depression of a finger-key of group B, lug 21 goes back for a distance equal to the thickness of one wheel 18 gearing thus with the second wheel and releasing the first one. As will be explained hereinafter, axle 17 is thus momentarily liberated so that driving-wheel 9 can pull along axle 4 for a distance which corresponds to the space between two letters. Under the depression of a finger-key of group A¹, lug 21 moves for twice the distance so that the two first escape wheels become free, axle 4 being consequently turned for a quantity corresponding to two spaces and so on with regard to groups A² and A³. The escape mechanism is so constructed that shaft 17 is being revolved immediately at the depression of one of the finger-keys of groups B, A¹, A², A³ so that the corresponding revolution of shaft 4 and resulting therefrom the advancing of the carriage is effected before the letters are printed.

The driving-wheel 10 is connected with toothed crown 6 by a similar mechanism as described with reference to the connection between crown 5 and driving-wheel 9 with that difference however that to facilitate the construction the toothed wheel 22 which carries the pawl does not mesh directly with driving-wheel 10 but is connected with the same by means of an intermediate gearing 23 which drags along shaft 24, said shaft corresponding to axle 15 and operating the axle 25 of the escapement by means of pinion 26. Upon said axle 25 six escape wheels 26 are mounted which are similar to the wheels 18, being stopped by lug 27 of slide-rod 28 which is connected with the finger-keys of groups P¹, P², P³, P⁴ in such a manner that if, for example, one of the keys of group P² be depressed, lug 27 will move back for a distance equal to double the thickness of a wheel 26, releasing thus two of said escape-wheels so that driving wheel 10 can drag shaft 4 along for a part of revolution corresponding to two spaces.

As shown in Fig. 2 the lugs 21 and 27 are normally in engagement with the inner escape-wheels of their groups. Shaft 25 therefore is not revolved when lug 27 is being shifted but when it returns to its normal position. Herefrom follows that the revolution of shaft 4 for the printing of one syllable is composed of two separate

parts, the advance of the carriage being also made in two parts. The carriage first moves forward for as many spaces as there are finger-keys of the groups A^3 , A^2 , A^1 and B being depressed, said motion being executed before the printing of the corresponding letters is being effected. Hereafter all the letters of the syllable are printed at the same time and the carriage advances for the corresponding number of spaces of the syllable only when the finger-keys of the groups P^1 , P^2 , P^3 , P^4 return to their original position.

If the syllable printed terminates the word, the carriage must advance for a supplementary space to separate the two consecutive words, which is accomplished by the depression of the space-key 1 effected with the little finger of the right hand and at the same time as the other fingers operate the keys for writing the syllable. Space key 1 is connected by a suitable lever system with a notch 29 of shaft 25 so that the depression of finger-key 1 effects the displacement of shaft 25 in the direction of the arrow for a distance which corresponds to the thickness of an escape-wheel 26, shaft 4 being revolved for a corresponding distance. Pinion 58 of shaft 25 is long enough to always remain in gear with axle 24. Shaft 17 carries a similar notch 30 which is coupled with the double-key Sc of group A^3 so that if this key be depressed the carriage moves for a supplementary space.

Figs. 4 and 5 represent the constructional details of the escape-wheels 18 and 26 which are identical. The inner wheel 18 is keyed upon shaft 17, the other five wheels being free to revolve around said shaft. Each of the wheels has a certain number of teeth 31, six in the example shown, said number depending only on the ratio of successive transmissions between said wheels and shaft 4 so that for each space motion of the carriage shaft 17 has to be turned through a part of a revolution which corresponds to the space between two consecutive teeth 31. Each of the loose wheels 18 has a curved slot 32 the length of which corresponds to the distance between two teeth 31, the first five wheels having a stud 33 which penetrates into the guide slot 32 of the adjacent wheel. The outer end wheel 18, (the left hand end wheel in Fig. 5) is connected with shaft 17 by means of a spiral spring 34, one end of which is fixed upon shaft 17, its other end being fixed to said wheel. Under the action of this spring the loose wheels 18 are turned so that each wheel stops the following one by means of its stud 33, all the escape-wheels being immobilized by lug 21. If however said lug 21 be displaced toward the left for a distance equal to the thickness of one wheel 18, the second wheel 18 will be stopped by said lug together with the remaining four, the inner end wheel being released so that it

will revolve under the influence of the spring of drum 7 until its stud 33 abuts against the other end of guide slot 32 of the adjacent wheel. The same motion will take place if lug 21 moves farther toward the left so that shaft 17 will be revolved for as many times the part of a revolution which corresponds to the length of slot 32 or to the distance between the teeth 31 of wheels 18 as lug 21 has been shifted to the left. Slide rod 19 will be pulled back by spring 20 as soon as it is released, each wheel 18 returning to its original position under the influence of spiral spring 34 as soon as lug 21 has stopped the wheel behind.

The operation of the escape-mechanism of groups P is reverse for the reason that normally lug 27 stops the escape-wheel 26 which is acted upon directly by spiral spring 34, so that, if the lug is being shifted through the depression of the finger-keys, the loose wheels being successively liberated revolve under the action of spring 34, without however influencing shaft 27 which will be released only when lug 27 has returned to its normal position, so that at this moment said shaft 25 will revolve for as many parts of a revolution as wheels 26 have been released by the displacement of lug 27.

Figs. 6 to 10 represent the arrangement of the finger-keys of one group. Fig. 6 shows the key-board of one group in ground plan; Fig. 9 is a cross section of Fig. 6 and Figs. 7 and 8 are section on lines A—B and C—D of Fig. 9. As shown in Fig. 10 each key 35 is fixed upon a vertical rod 36 to which is fixed at about the middle a perpendicular arm 37 which carries at its other end a rod 38 which is parallel with rod 36 but considerably longer than this rod. All the rods 36 are guided in guide-plates 39 and 40, spiral springs 41 being inserted between plate 40 and the arms 37 destined to maintain the keys 35 in raised position. The rods 38 which are all in alinement project through holes of plates 40 which run parallel with the long sides of guide plates 39, 40. A shaft 42 is arranged below guide-plate 40 having as many radial arms 43 as there are keys 35 in the group, each of said parallel arms 43 being below its corresponding rod 38. Rods 38 being in alinement bear upon the arms 43 at equal distances from shaft 42 whereby in combination with the suitably calculated force of the springs 41 identical resistance is obtained for all keys 35, although the distances between shaft 42 and the several keys 35 differ considerably. At one end of shaft 42 a crank arm 44 is fixed which is maintained in lifted position by means of a spiral spring 45 and bears upon the upper end 46 of a vertical slide bar 47 which is maintained in lifted position by means of spring 48. It is obvious that whichever be the key 35 of the group which

has been depressed the slide bar 47 of the group will be depressed for a determined distance and that as soon as the pressure upon the key 35 ceases, said key will return to its original position, spring 45 returning shaft 42 and spring 48 the slide-bar 47 to the original position.

Fig. 11 shows how the eight slide-bars 47 of the eight groups of letters act upon the slide-rods 19 and 28 for effecting the required escapement of shafts 17 and 25. The means for accomplishing this result include four roller-disks 49 for each slide rod, one for each slide-bar 47 so that the lower end of each slide-bar is in contact with one roller disk. The lower ends of slide-bars 47 are beveled, the inclines 50 being calculated so that at the descent of one of the slide-bars 47 the corresponding roller-disk 49, and consequently its slide-rod will be shifted for a distance equal to the thickness of one of the escape-wheels 18 or 26 for the groups B and P¹, equal to the thickness of two of the escape-wheels for the groups A¹ and P², of three escape wheels for the groups A² and P³ and of four escape-wheels for the groups A³ and P⁴.

If, for example, a syllable composed of six letters has to be typed whose base-vowel occupies the third place, one key of each of the following groups:—A², A¹, B, P¹, P², P³, will have to be depressed. The depression of the key of group A² will produce the shifting of slide-rod 19 toward the left for a distance corresponding to three escape-wheels 18; shaft 17 therefore will revolve and move the carriage for three spaces; the depression of the key of group P³, corresponding to the last letter of the syllable, will have the same effect with regard to slide-rod 28 which will be displaced to the right for a distance equal to three escape-wheels 26. The depression of the keys of groups A¹, B, P¹, P², has no effect upon slide-rods 19, 28. If now the keys are released, slide-rod 28 returning to its normal position under the influence of spring 51, the carriage will move for three further spaces, so that in all it will have moved for six spaces, the six letters having been printed simultaneously.

Referring to Fig. 11 it will be seen in what manner the keys I and Sc are connected with shafts 25 and 17 for the purpose to effect the supplementary motion of the carriage for the length of one space each time one of said keys is being depressed. As has been said already, said keys are coupled with shafts 17 and 25 respectively by means of the connecting-rods 52 and 53 and the levers 54, 55, blade-springs 56, 57 serving to maintain shafts 17 and 25 in their normal positions. The movement of the levers 54, 55 is calculated so that the depression of keys I and Sc effects the shifting of shafts 17 and

25 for the length of one escape-wheel, pinions 16 and 58 remaining in gear with the corresponding spur-wheels.

Figs. 12 and 13 represent a modified construction of the lower parts of slide-bars 47 with a view of permitting the use of the syllable-writing-machine for the type-writing letter by letter as usual. This device is indispensable for typists who want to learn how to use the syllable-writing-machine to familiarize the same with the arrangement of the key-board. In practising upon the machine the typist has of course to observe the instructions according to which he has to choose the several letters in the group which corresponds to the position of the letter in the syllable; if, for example, the word "IN" has to be written, the letter "I" of group B and the letter "N" of group P¹ have to be depressed, or to write the syllable "Tri" the corresponding letters of groups A², A¹ and B have to be depressed.

If with the type-writing machine as hereinbefore described letter by letter is written, said letters will be well printed but they are spaced irregularly, the depression of a key effecting the movement of the carriage for a variable number of spaces according to the group to which the key belongs; if, for example first a key of group A² and then a key of group A² be depressed, the letters printed will be separated by the four spaces for which the carriage has been shifted owing to the depression of the key of group A². To amend this the lower part of the slide bars are modified as shown in Fig. 12.

Referring to Fig. 12 it will be seen that only the two end slide bars 47 act upon the slide rods 19 and 28 which further are not under the influence of the springs 20 and 51. The slide bars 47 are prolonged at their lower ends and have inclines adapted to act upon two auxiliary transverse slide rods 74 and 59 provided with catch-pins which are shown in Fig. 14 on a larger scale. Said catch-pins 60 can freely move in horizontal direction in a guide-piece 61 fixed upon the slide-rods 74, 59; the extension 62 of the slide bars 47 which bears against said guide-pieces 62 has a notch 63 at the side which is in contact with said guide-piece and adapted to be placed opposite the end of the catch-pin 60 if the corresponding slide-bar 47-62 be depressed, so that the catch-pin is pressed into the notch under the action of a spring 64 and retains the slide-bar which thus is prevented from going up again. To release the slide-bar from catch-pin 60 the corresponding slide rod, 59 for example, has to be laterally displaced, withdrawing at the same time the catch-pins from their notches so that the slide-bars are free to follow the action of their springs 48. In this manner all the

slide bars can be successively locked; the unlocking of said slide-bars is effected by means of inclines 65 situated at the right hand side of the extensions 62 of the slide-bars for the groups A³, A², A¹ and B and respectively by an incline 66 arranged at the left hand side of the slide-bar for group B. Said inclines act upon rollers 67 of slide rod 74 and upon rollers 68 of slide rod 59.

To typewrite a syllable of say eight letters letter by letter, the first letter is typed by pressing on the corresponding key of group A³; the descent of slide bar 47 of this group has for effect to shift the carriage for four spaces; this slide bar being locked by the first catch-pin 60 of slide rod 59 therefore will remain in its lowest position, so that the slide rod 18 is maintained in its extreme position shifted to the left, and will not be influenced in any manner by the slide bars of groups A², A¹ and B, so that the carriage does not shift. By pressing upon the slide-bar 47 of group B the incline 66 of this slide bar will be brought in contact with the roller 68 of slide rod 59 and push the same to the left whereby simultaneously all the slide-bars of groups A³, A², A¹ are released. The slide bar of group B has no notch 63 and can never be locked. If a key of group P¹ be pressed slide rod 28 will be shifted to the right for one space and its slide bar will be locked by the extreme left hand side catch pin 60 of slide rod 58. The depression of any key of groups P², P³, P⁴ effects the shifting of slide rod 28 to the right for one space every time so that, finally, slide rod 28 will have moved toward the right for four spaces and that the four slide bars 47 of the groups P¹, P², P³, P⁴ are locked. The carriage has not moved. As soon however as again one of the keys of the groups A³, A², A¹ and B be pressed to type the first letter of the following syllable, the incline 65 of the corresponding slide bar 47 in acting upon the corresponding roller 67 of slide rod 74 will shift said slide rod to the right, against the action of spring 70 and disengages simultaneously the four

locked slide bars; at this moment the carriage will shift for four spaces, as slide bar 47 of group P⁴ has been operated and it will besides advance for three further spaces if, for example, a key of group A² has been pressed.

If the syllable typed terminates a word, the space-bar 1 has to be operated to advance the carriage for one space as hereinbefore explained, and further to unlock the four slide bars of the groups P¹, P², P³, P⁴ by means of rod 71 which acts upon slide rod 72 acting upon the roller 73 of slide rod 74.

I claim:—

The mechanism for dividing the movement of the paper cylinder into two parts, comprising in combination a spring barrel, two toothed wheels fixed to said spring barrel and having the teeth directed in opposite directions, means for directly driving the paper carriage from one of said toothed wheels, a means of driving the paper cylinder by the other toothed wheels, two escapement mechanisms connected the one with the one of the toothed wheels of the spring barrel, and the other with the other toothed wheel of the spring barrel, tooth like rods, a stop on each sliding rod engaging with the teeth of one escapement wheel, four sliding bars operated by the keys of the group which comprises the base vowels and by the three preceding groups of characters, inclined faces of said sliding bars corresponding in length with the distance of one, two, three, or four spaces, and four sliding bars operated by the keys of the four right hand groups of characters, and inclined faces similar to those of the preceding sliding bars, substantially as described and shown and for the purpose set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

PAUL DE CARSALADE DU PONT.

Witnesses:

FERDINAND NURD,
RUDOLF GREY.