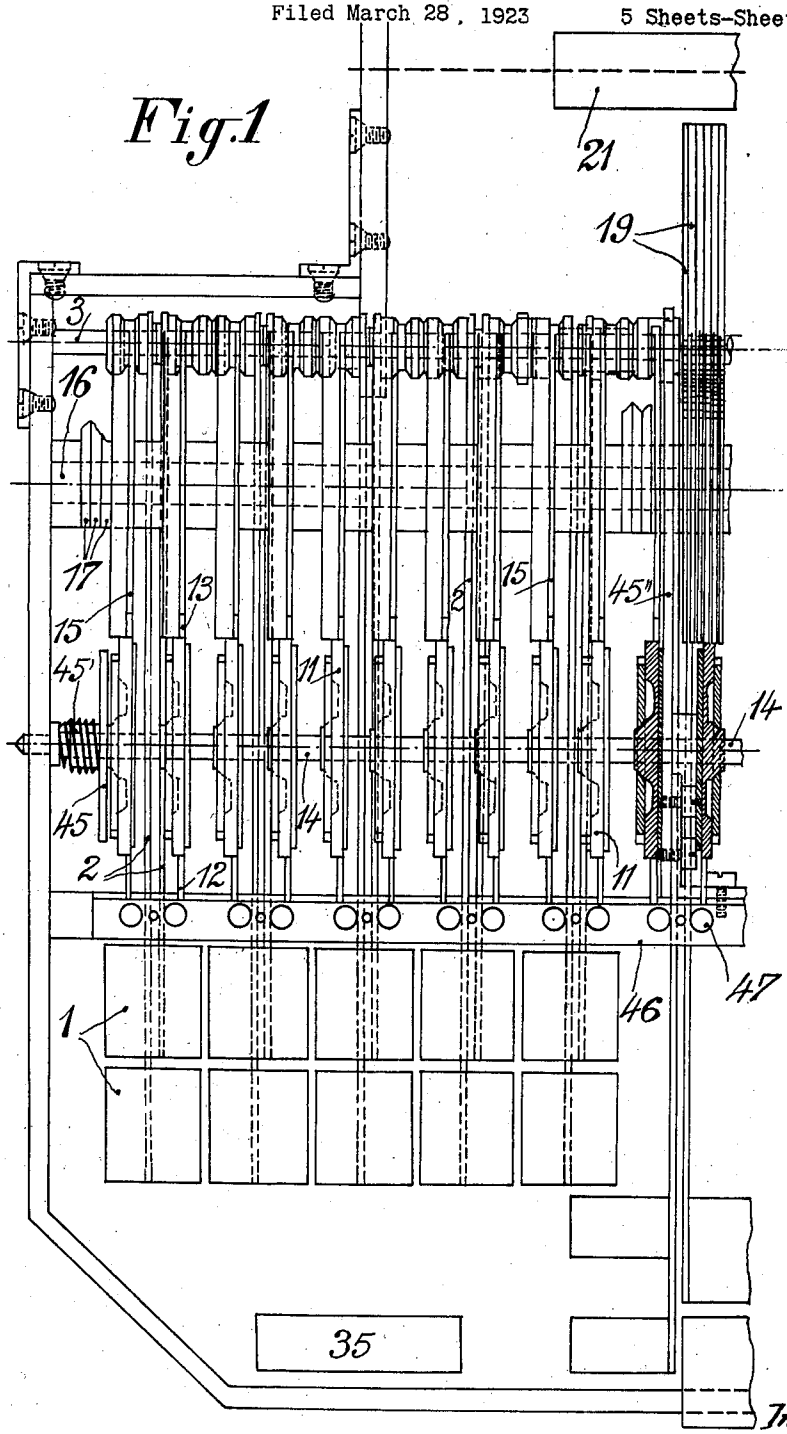
June 8, 1926. 1,588,097

V. C. DOLD

STENOGRAPHIC MACHINE

Filed March 28, 1923 5 Sheets-Sheet 1

Fig. 1



Inventor
V. C. Dold
by [illegible] atty.

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V. C. DOLD

STENOGRAPHIC MACHINE

Filed March 28, 1923 5 Sheets-Sheet 2

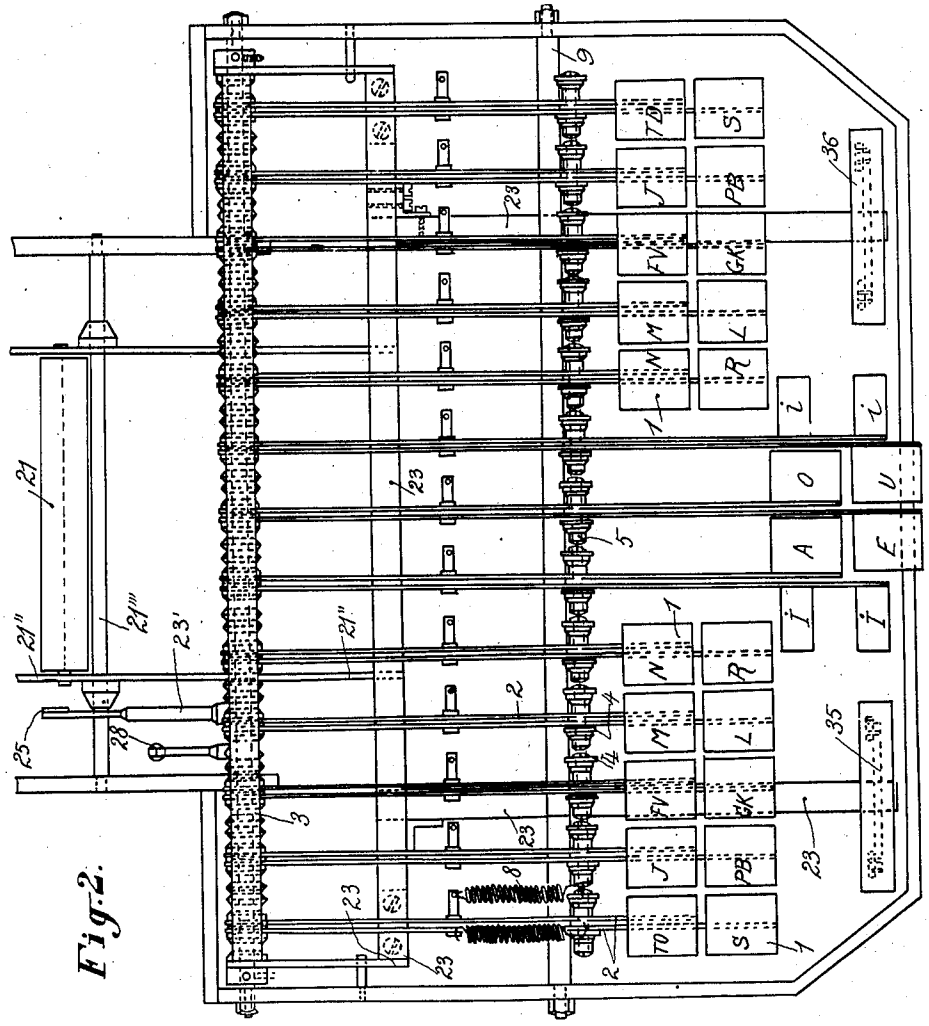


Fig. 2.

Inventor
V. C. Dold

by Jno Dunne
Atty.

June 8, 1926. 1,588,097

V. C. DOLD

STENOGRAPHIC MACHINE

Filed March 28, 1923 5 Sheets-Sheet 3

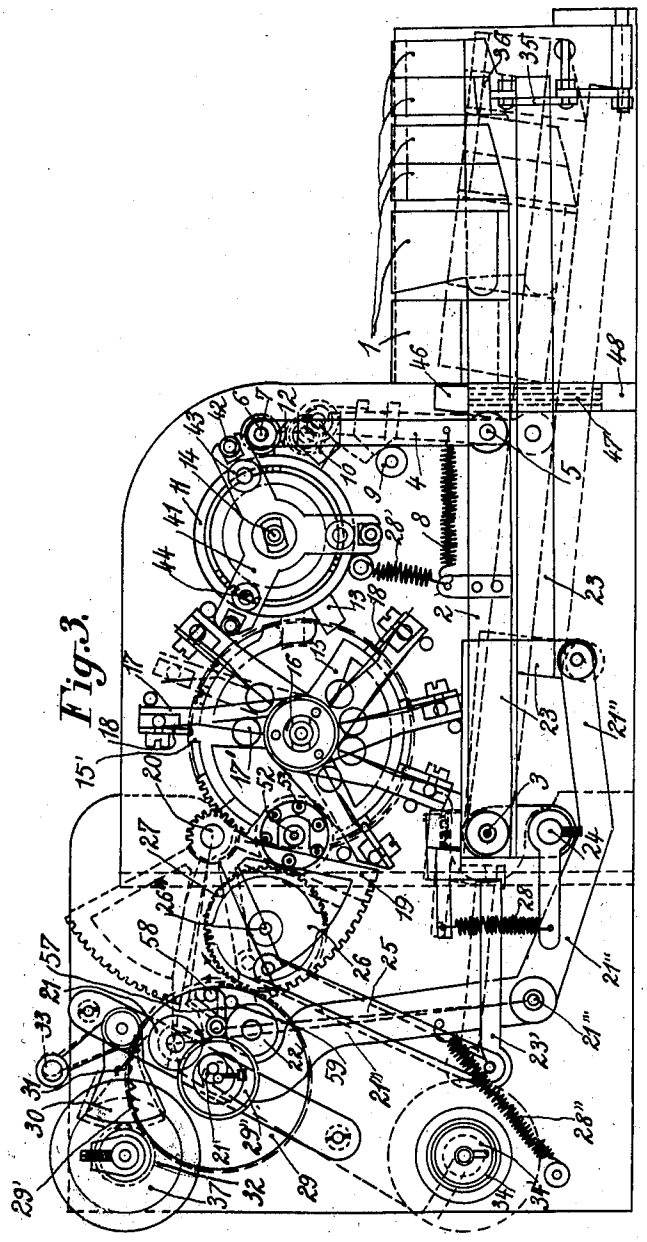


Fig. 3.

Inventor
V. C. Dold
by [illegible] Atty.

June 8, 1926. 1,588,097

V. C. DOLD

STENOGRAPHIC MACHINE

Filed March 28, 1923 5 Sheets-Sheet 4

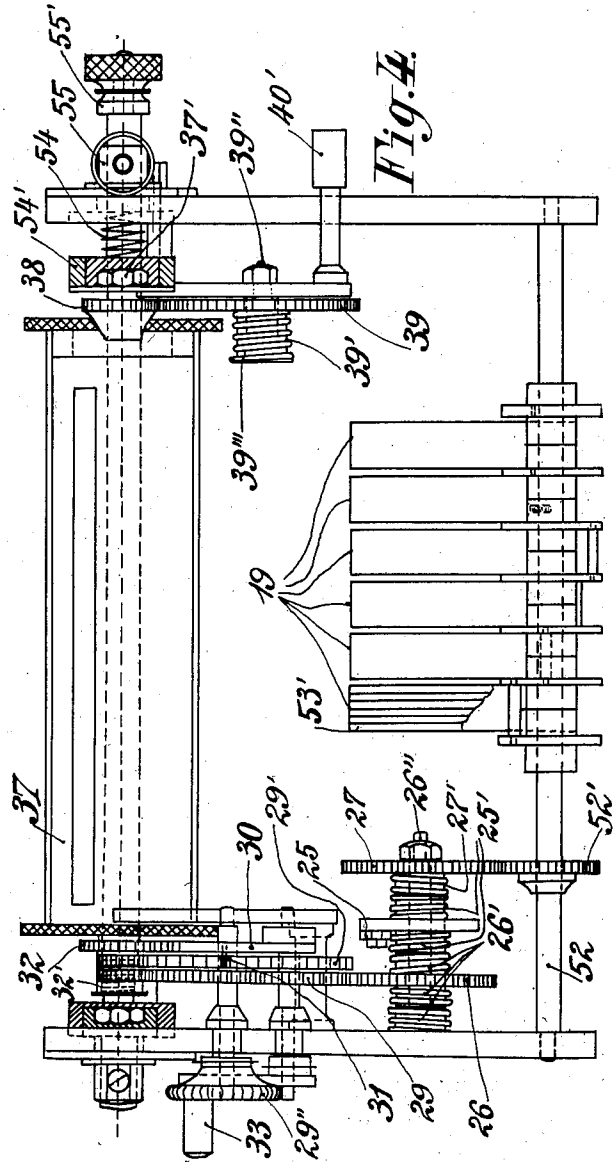


Fig. 4.

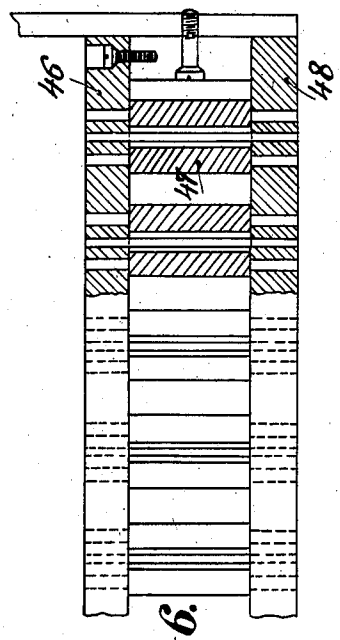


Fig. 6.

Inventor
V. C. Dold

by Jas. Turner Atty.

June 8, 1926. 1,588,097

V. C. DOLD

STENOGRAPHIC MACHINE

Filed March 28, 1923 5 Sheets-Sheet 5

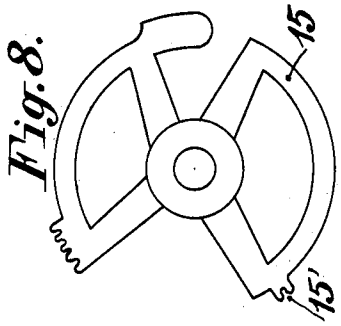


Fig. 8.

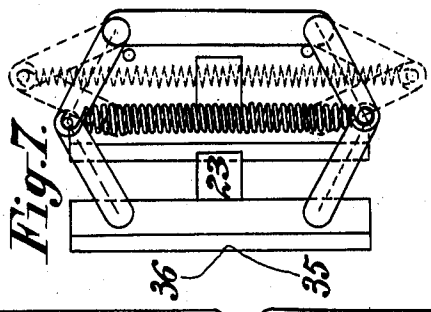


Fig. 7.

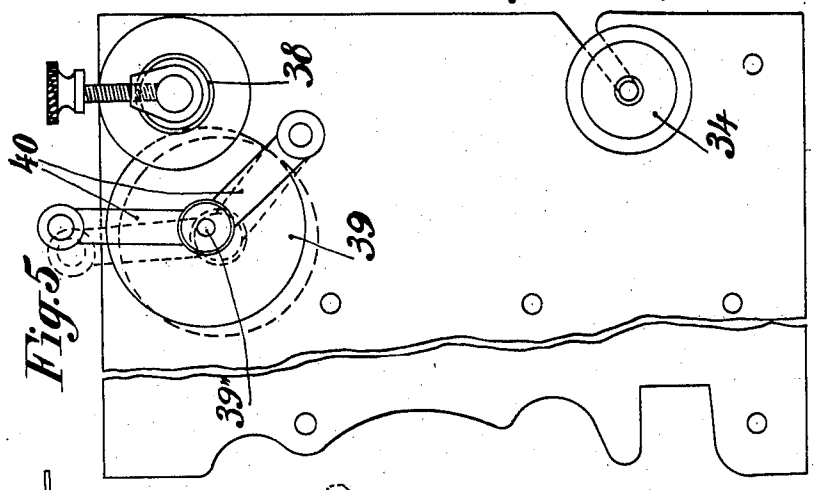


Fig. 5.

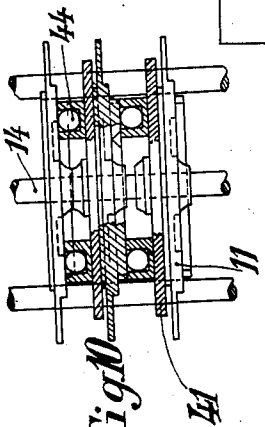


Fig. 10.

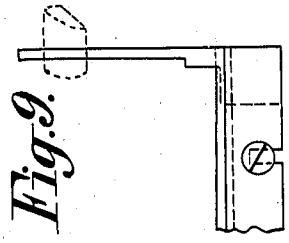


Fig. 9.

Inventor
V. C. Dold
by [illegible] Atty

Patented June 8, 1926. 1,588,097

UNITED STATES PATENT OFFICE.

VICTOR-CHARLES DOLD, OF ISSY-LES-MOULINEAUX, FRANCE.

STENOGRAPHIC MACHINE.

Application filed March 28, 1923, Serial No. 628,383, and in France March 29, 1922.

This invention relates to stenographic machines. Known stenographing machines leave irregular spaces often too large between the printed characters. In known systems, several syllables are not made on the same lines; no margins separating the texts for a page.

Further, one cannot recommence writing at the beginning of a line and it is not easy to read over what is written.

The present invention has for object to avoid or lessen these inconveniences and to provide a stenographing machine in which chiefly the impression of the characters one after another takes place without irregular spacing there-between, as well as the impression of several sylables on the same line in which the production of a margin is made when a surface of the predetermined size is printed. It offers, also, the possibility of instantaneously replacing the machine in position to recommence the impression of a complete page or of a new line, even if the preceding work stopped at the middle of a page or at the middle of a line; there will also be found means for causing the printed paper to return to its starting position without necessity of withdrawing the enrolling cylinder from its normal position.

Finally the means for rolling up the paper as printed, to enable it to be read is effected by a finger on the handle of a sector, thus causing the abrupt enrollment of several lines at once. It also offers various other advantages which will be obvious from the description hereinafter given.

The invention will now be described in detail by reference to the accompanying drawings showing, by way of example and diagrammatically, a form of construction of a stenographing machine for writing on separate sheets or on rolls of paper.

Fig. 1 shows a plan view of part of a machine with keyboard, cams, intermediary wheels and impression sectors.

Fig. 2 shows in plan the keys and levers, the stirrup, the punctuation key-levers or space levers and the frame with the impression roller.

Fig. 3 is the left hand elevation partly in section of the machine.

Fig. 4 is a plan view of the rear of the machine.

Fig. 5 is a right hand elevation of the rear of the machine.

Fig. 6 is a front elevation of part of the guide frame for the key levers.

Figs. 7–8–9–10 indicate details of construction.

The machine forming the object of the invention, stenographs in ordinary characters and permits of writing with a single touch, a complete syllable which may have anything up to six characters.

The keyboard of the machine generally has twenty-six keys; at the left side there are ten for the consonants or combinations of consonants commencing the syllable; at the centre there are six for the vowels I—A—E—O—U—I which may be touched alone or preceded by or followed by one or several consonants; at the right side, ten for the consonants or combinations of consonants terminating the syllable.

This arrangement of the characters or keys permits of writing at a single touch by the simultaneous depression of the necessary keys, six characters in the order in which these are placed in the syllable.

The order in which the characters follow each other on the keyboard is established in conformity with the result of a philologic study of stenography.

In the particular case of the Latin language, in general certain consonants occupy an unchangeable row before the vowels, in relation to other consonants, for example R never precedes S, at the commencement of a syllable; N never before M, L never before M, etc.

The order of the characters on the keyboard is as follows:

From left to right initial consonants:

S—DT—BP—J—GK—VF—L—M—R—N.

In the centre, the vowels; I—A—E—O—U—I.

At the right, the terminal consonants; R—N—L—M—GK—VF—BP—J—S—TD.

As will be seen, the consonants having about the same consonance are joined into a single one, it is thus that when impressed, D or T are rendered by DT; B and P by BP; V and F by VF; G and K by GK; this is for the purpose of reducing the number of keys.

There are twenty-six characters distributed over the periphery of thirty-six sectors 19, which form in the machine six groups of six sectors each; the sectors bear in relief the following characters;

First sector left side; S—DT—BP—GK—VF.

Second sector; S—DT—BP—J—GK—VF—L—M—R—N.

Third sector; S—DT—BP—J—GK—VF—L—M—R—N—I.

Fourth sector; A—E—O—U—R—N—L—M—GK—VF—BP—J—S—DT.

Fifth sector; E—O—U—I—R—N—L—M—GK—VF—BP—J—S—DT.

Sixth sector; I—R—N—L—M—GK—VF—BP—J—S—DT.

Each key 1 is integral with a lever 2 pivoted on a axis 3. Each key through the intermediary of its lever 2 and of a tension member 4 pivoting at 5 acts on a cam 11 turning around an axis 14.

In depressing a key 1 a downward movement is given to the tension member 4 which latter by reason of its roller 6 pivoting on 7, transmits and transforms the movement of the cam into a partial rotary movement.

Each of the cams 11 can control three intermediate wheels 15. In the position of rest, the cams depending from the nine first keys on the left side come beneath the third intermediate wheel, the cam of the tenth key N comes beneath the second wheel and the cam controlled by initial I comes beneath the single wheel which it controls.

The cams depending from the five other vowel keys as well as those controlled by the keys of the terminal consonants are placed, in the position, of rest, beneath the first of the three intermediate wheels which face them.

The intermediate wheels carry on their contours an isolated tooth 15^1, by means of a rule 18 fixed on a bridge 17 having a return spring 17^1 and introduced in the teeth of each wheel of the same group, so rendering these wheels integral one with another. It follows that upon the depression of a key and the rotation of its cam one of the third wheels of the nine first keys, for example is made to turn and all the third wheels controlled by the nine keys in question will turn at the same time without the need of their keys being depressed.

In short, the operation of one key of any description in the right group or the left hand group arranged at no matter what part of the keyboard transmits its movement to all the wheels of the same value; these being integral the ones with the others.

Each of the intermediate wheels placed opposite the cams of the keys A—E—O—U—I—R— can mesh with a character impression sector 19.

In order that the intermediate wheels controlled by the eleven initial keys can act equally upon the sectors, they are reproduced beneath these, which permits of the eleven left hand keys to influence the three first sectors of each of the six groups and thus to print the initial consonants and the first vowel I.

By following the mechanism it will be seen that 20 is the axis for the sectors 19; 21 is the roller compressing the paper against the edges of the printing sectors; 21^I is the counter roller; 21^{II} is the frame pivoting around the axis 21^{III} and carrying the rollers 21—21^I; 22 is the inking roller; 23 is the stirrup fastening beneath the key levers and acting by lowering itself on the train of wheels for rolling up the paper by the connecting rod 25, as well as upon the frame carrying the rollers 21—21^I. Thus causing the impression; on the other hand by rising, the stirrup acts upon the axis 52 carrying six studs 53 which place sucessively the six groups of sectors in position for impression.

On the axis 26^{II} is found a double tooth segment which at each half turn corresponding to the impression of a line of six syllables, causes the ratchet 29^I to advance one tooth and by means of the toothed sector 30, the pinion 32 of the enrolling member 37 to the value of one line.

On the axis 26^{II} is also mounted the wheel 27 which at each lift of the stirrup imparts to the axis carrying the studs a sixth of a turn.

28^I—28^{II} are springs for returning the stirrup, the key levers and the frame 21^{II}, the wheel 29 and the ratchet are integral and receive their movement from the stirrup and the double segment 26 and is transmitted through the sector 30 to the wheel 32 and the enrolling member 37.

The sector 30 can be operated by hand by the handle lever 33 and the enrolling member can be replaced at the commencement of a page by the button 29^{II}.

The cylinder 34 is a housing for blank paper and 34^I are buttons for turning it by hand. 25^I, 26^I, 27^I, 32^I, 39^I are drums on which are wound tension springs for the tension members and brakes. Pinion 38 of the enrolling member meshes with wheel 39 on the axis 39^{II} carrying the brake 39^{III} and the handle 40^I, the brakes opposing the backward movement of the enrolling cylinder while the disengagement by means of the handle 40^I permits of this backward movement.

A spring 54 causes the automatic contact between the ball race 54^I and the pivots 37^I of the enrolling shaft 37; the loosening of the screws 55 and the pulling of the knob 55^I frees the enrolling cylinder.

Beneath the key levers and traversing the entire width of the machine, is a stirrup 23

which turns around the pivots of the axis 3 and follows the same course as the key levers against which it bears through a spring.

By means of the connecting rod 25 the lever 23 acts upon the gear 26, 27, 29 on the small toothed sector 30 as well as on the pinion 32 of the enrolling cylinder 37 and on the pinions 27 and 52 thus causing the enrolling or advance of the paper when a line is printed and the successive impression of the six syllables by the impressing mechanism is made.

The stirrup has the further function of acting upon the frame which carries the caoutchouc roller over which passes the paper and to compress the latter against the sectors to obtain the impression.

If it is now desired to write with the machine and print for example the word of a single syllable "Soupe" the keys bearing the characters to be reproduced are simultaneously depressed; stenography being phonetic, one does not write soupe but "soup" (e) one depresses therefore initial *s*, at the left side, *o u* in the middle and BP terminals at the right; these four keys will therefore cause a partial rotary movement to the four cams 11 which they control.

The cam for initial S, in turning, will act below the intermediate wheel 15 which is opposite to it, that is to say the third, and this one carrying along with it, through the striker 18 of the bridge 17 the other wheels placed beneath the eleven left hand keys, as well as the third wheels placed beneath the sectors, will lift the third sectors of each of the six groups until the letter S comes in the axis of the impression roller.

To write the letter O—U—BP the keys bearing these characters are depressed.

In depressing the first of these keys, one imparts not only a partial rotation of its cam but the latter displaces laterally from left towards the right all its neighbours (from 1.5 mm. i. e. the thickness of one intermediate wheel). This displacement is obtained in the following manner: Each cam is furnished on one of its bases, on the left for the left hand group, at the right for those of the right hand group with three recesses in the form of a V.

These recesses receive in the position of rest the protruding part of 1.5 mm. of three steel balls 44 placed in the housings 43 formed on the intermediate members having three arms 41.

In turning, each cam, by the action of its V-shaped recesses on the balls, forces these to spread apart to give it passage.

Fig. 10 shows an element of the cams of the right hand group during the action of the key lever of the cam 11.

Any displacement in the opposite direction i. e. towards the centre of the machine is made impossible for the cams of both groups by the presence of the division 45^{II}.

It therefore results that each time a cam is made to turn its neighbours are displaced, to the left or to the right, by the thickness of one intermediate wheel.

It is thus that having depressed the key O and caused its cam to turn, it will act on the first intermediate wheel, one will obtain by lateral displacement to the right change of position of the other cam which it is desired to rotate; they will now act on the second intermediate wheel and influence the fifth sector while the cam will act upon the fourth sector. In next lowering the key U, the same lateral movement will occur for all the neighbouring keys to the right of U including BP, towards the right in such a manner that the final result is obtained as follows; S not displayed laterally, or will act upon the third sector; O not displaced laterally, will act upon the fourth sector; U displaced by O, will act upon the fifth sector, and BP displaced by U, will act upon the sixth sector.

The intermediate wheels must not be influenced, by the cams except when the lateral movement thereof has ceased.

For this purpose the shaft 14 of the cams is not in contact with the intermediate wheel, but between the two members is reserved sufficient play to permit of the necessary rotation of the cam for the spreading apart of its neighbours.

The characters of necessity occupy each another place on the periphery of the sectors; it results that the cams must give them a shorter or longer stroke according to whether the character is placed at the commencement or at the end of the arc of the sector.

For example initial S placed at the top of the sector, would necessitate a less depression of the key than initial R at the bottom.

Nevertheless, the stroke of each key lever must be of the same amplitude. To conciliate these two conditions use has been made of the special tension members 4. These carry at the upper half of their length a member furnished with an inclined plane 10.

This member is mounted at a variable height for each tension member, in such a manner that when the character to be impressed has reached the axis of the impression roller, the member 10 by its descending movement imparted to it by the lever 2, abuts against the stem 9 which passes through the whole width of the machine.

The tension member, although the key lever always descends, still follows but no longer acts on the arm 12 of the cam 11.

In fact the inclined plane causes the tension member to commence a movement around its axis, backwardly, and this movement which has no further effect upon the cam lasts as long as the lever 2 does not commence its upstroke. At this moment

the return spring 8 obliges the tension member to return to its initial position.

The key levers 2 no longer having any action on the sectors, intermediate wheels and cams, as soon as the required character is positioned for printing, the rest of their stroke is utilized to provoke the contact of the rubber roller 21 which carries the paper with the raised sectors to form the syllable and thus produce the impression.

The roller 21 is mounted on the upper part of a frame whose lower cross member passes below the stirrup 23 at a distance such that the latter comes in contact with that one shortly before the end of the movement of the stirrup.

By this contact the roller 21 is displaced towards the axis of the sectors, presses the paper against the characters which have become inked in passing on the inking roller 22 and causes their impression upon the paper.

It has been seen above that the intermediate wheels of the same groups having been rendered integral one with the other by the bridge 17 and its striker 18, each time that a wheel is set in motion, all the corresponding sectors of the six groups were raised for printing.

Nevertheless it will be seen that the sectors rise one after another, firstly those of the first group, then those of the second group, the third group etc. up to the sixth group, because this successive movement alone gives the impression of the six consecutive syllables, upon one line.

To ensure that the six groups act one after another an arrangement has been adopted consisting of the shaft 52 furnished with a pinion 52^{I} and six studs 53.

This shaft receives its intermittent circular movement through the intermediary of the wheel 27; each time the connecting rod 25 returns to its point of departure, it causes the shaft 52 to turn one sixth of a turn and places successively each of the group of the sectors in position to gear with intermediate wheels.

The six studs mounted on this shaft also comes successively in contact with the faces of a group of sectors, causing the raising of the group and obliging it thus to mesh with intermediate wheels to be subjected to their influence.

When it is desired to place the machine in position to start a line i. e. to impress the first syllable of a line, the first stud 53 is placed in contact with the first group of sectors, by the number of depressions necessary on a punctuation or space key 35, 36.

The large wheel 29 which receives its movement through the connecting rod 25 is integral with a ratchet having 47 teeth. A pin 31 of the sectors 30 rests at the bottom of one of the teeth of the ratchet 29^{I} and when at each of its movements the rod 25 imparts an intermittent rotary movement to the wheel 29 and to its ratchet, the pin 31 by reason of the rotation of the ratchet leaves the bottom of the tooth, passes above the top thereof and lodges itself in the neighboring tooth.

This movement is accompanied by that of the sector 30 to which the pin 31 is fixed and is finally transmitted by the pinion 32 to the enrolling cylinder 37; the advance of one ratchet tooth is translated by an advance of 5 mm. length of paper; this constitutes the interlining.

An arrangement permits of printing surfaces of commercial size and to reserve between two printed sheets of this size a blank margin of such a width that it will be easy to divide the rollers printed in sheets of equal size and classify the same.

The ratchet with its 47 teeth; the space occupied by one of its teeth corresponding to the value of one line, one will have printed 47 lines to each turn of the ratchet wheel.

These 47 lines form a page; the 47th tooth of the ratchet having a hollow space deeper than the others permits the pin 31 a greater drop and consequently gives to the sector 30 more movement yet imparts greater movement to the enrolling cylinder 37, so providing a blank margin.

When, before starting the work on the machine it is desired to place it in position to start a full page, the knob fixed at the end of the pivot of the wheel 29 and of the ratchet, is turned in such a manner that the pin 58 bears upon the pawl 57 which itself rests upon the stop 59.

This position of the knob and ratchet which it controls, coincide with the commencement of a page.

The frame 46—48 with its supports 47 is destined to guide the key levers; the upper bar 46 can be removed for the introduction of the levers in the frame.

When the action on the keys has ceased the different organs return to their initial positions with the exception of those which have to have an action intermittently but in the same direction.

The key levers are brought back by springs 28^{I} the cams turning backwardly and the intermediate wheels returning to their places through the action of the springs acting upon the ridges and strikers 17 and 18, the sectors redescend under the action of the intermediate wheels and by their counterweights, the stirrup 23 rises again, also by reason of the spring 28; the laterally displaced cams are returned to their initial positions by two plates 45 disposed at each extremity of the axis carrying the cams and influenced by an antagonistic spring 45^{I}.

The paper housed on the cylinder 34 passes between the roller 21 and the counter roller 21^1 and after having passed around the roller 21 rolls itself upon the cylinder 37.

The members destined to have no movement backwardly are held in position by brakes consisting of tension springs; the members, under the influence of said brakes, can freely turn in the direction in which movement is allowed them, but the tension of the spring prevents movement in an opposite direction. In the machine the brakes are applied to the following members:

1. In the pinion 32 in which the ascending movement alone of the sector 30 has to be imparted and not its downward movement.

2. On the drums of the movable members carried along by the connecting rod and controlling the large wheel 29 and the pinion of the axis 52.

3. In the brake 39, this brake which prevents the backward movement of the cylinder 37 is mounted against the right rear bed-plate on an arm pivoting and constituted by a wheel 39 to which a spring brake 39^1, in tension, permits of a movement in one direction only.

This wheel meshes with a pinion 38 mounted on the enrolling cylinder and when these two movable members mesh together the return movement of the cylinder becomes impossible, but when for the purpose of re-reading, it is desired to turn back the enrolling cylinder in the opposite direction to unroll the paper, the arm 40 is pushed back with the wheel 39 out of gear so that the cylinder is freed and can turn in both directions.

When, for the purpose of re-reading, the paper has been caused to turn backwardly to the start of the printing, in order to wind it back step by step as the matter is re-read, the handle lever 33 mounted on the sector 30 can be used. The action of the finger on this handle permits of enrolling the portion of the sheet which is visible and which has already been read through, by a single and rapid movement.

The two keys 35 and 36 are articulated and provided with a return spring, each on a lever which acts when it is depressed, on the stirrup 23; they impart, the first a sixth of a turn, the second, two sixths of a turn to the shaft 52 with its studs 53.

That causes one or two spaces of the width of one syllable on the paper and acts as punctuation; the key 35, one blank syllable, equal comma; the key 36, two syllables blank equal full-stop.

The mechanism constituted by the laterally displaceable cams for operating several groups of sectors and thus give the impression of several syllables on a same line as in the constructional embodiment shown, or else act on a single group of sectors; in this latter case the paper is displaced in the opposite direction and the impression is made on a narrow strip, the syllables follow each other continuously on the same line.

This arrangement would be advantageous for machine writing on a narrow ribbon lengthwise and continuously from left to right.

In the drawing is shown a machine impressing six syllables but this number is not limited and the number of syllables can be increased by increasing the number of groups of sectors.

The same applies to the keyboard in which the number of keys may vary, the keys 35 and 36 can be operated by the fingers but their disposition enables them to be actuated by the handles so that the fingers do not have to leave the keys.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A stenographing machine having character bearing sectors, means including cams for operating said sectors, and means operative in the movement of one cam to induce lateral movements to adjacent cams for subsequent cooperation with other sectors.

2. A stenographing machine having character bearing sectors, means including cams for operating said sectors, means operative in the movement of one cam to induce lateral movements to adjacent cams for subsequent cooperation with other sectors, and tension members to cause the cams to move through a predetermined angle.

VICTOR-CHARLES DOLD.