Sept. 29, 1942. I. SZEGÖ ET AL 2,296,881

TYPEWRITING MACHINE

Filed Nov. 21, 1939 3 Sheets-Sheet 1

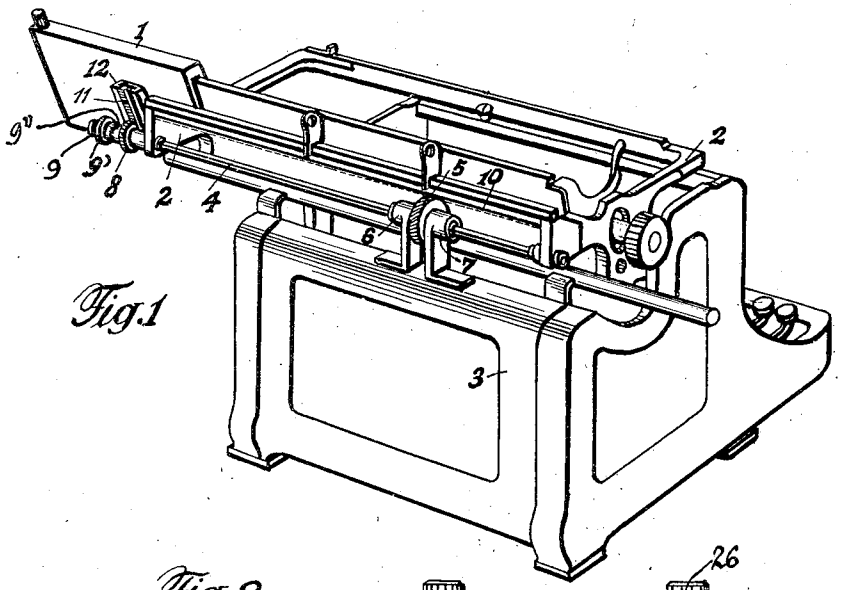


Fig. 1

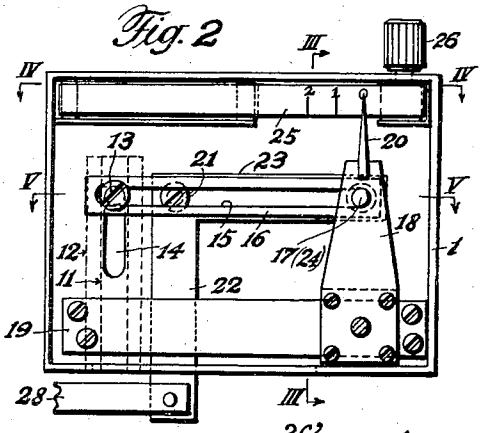


Fig. 2

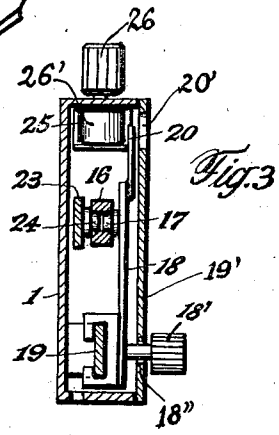


Fig. 3

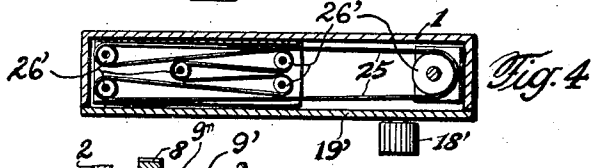


Fig. 4

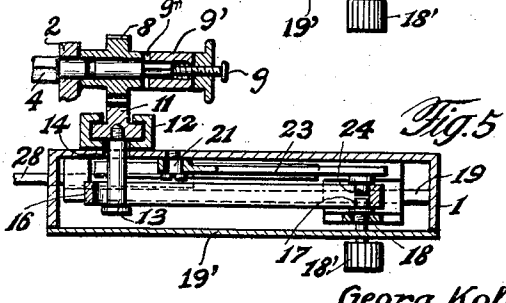


Fig. 5

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TYPEWRITING MACHINE

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Fig. 6

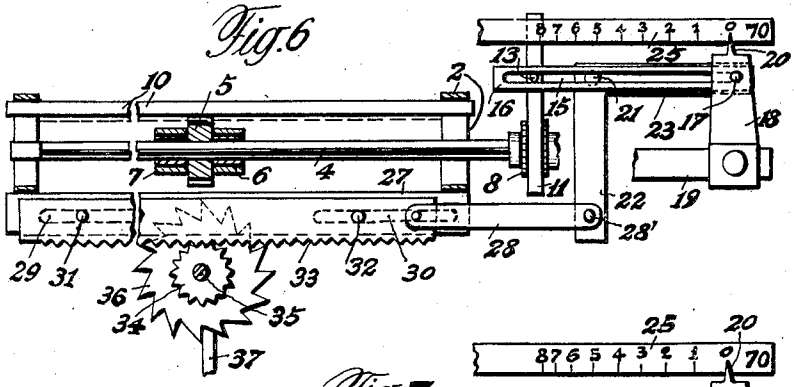


Fig. 7

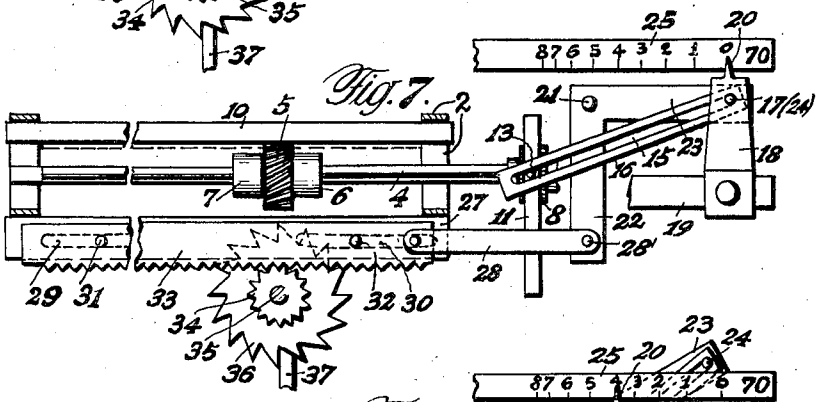


Fig. 8

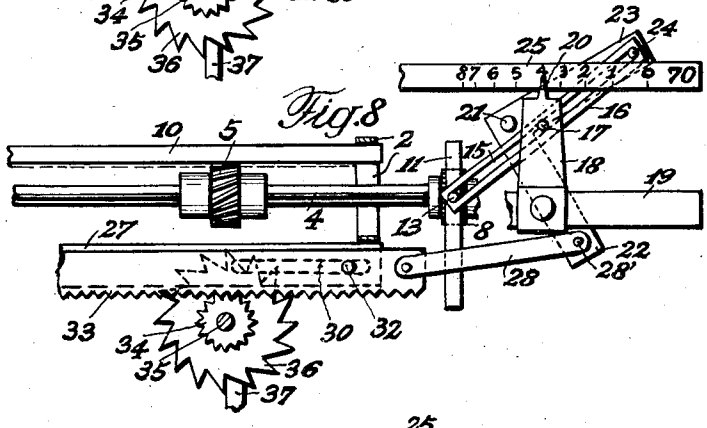
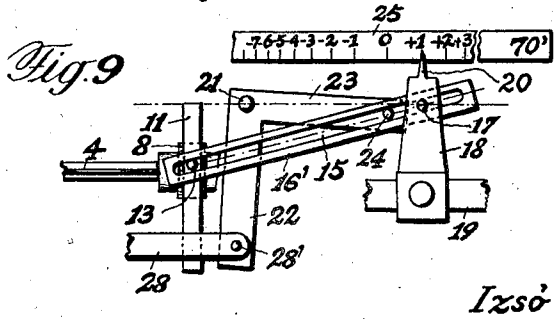


Fig. 9



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TYPEWRITING MACHINE

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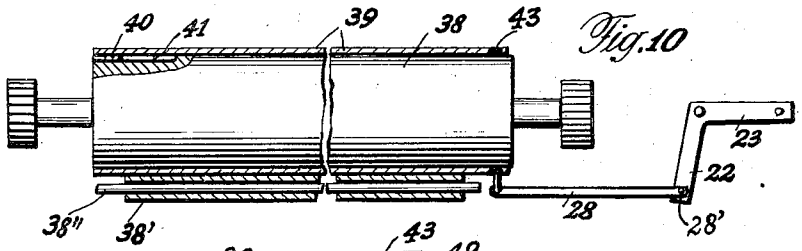


Fig.10

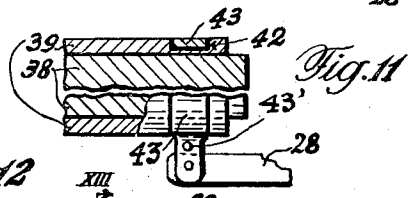


Fig.11

Fig.12

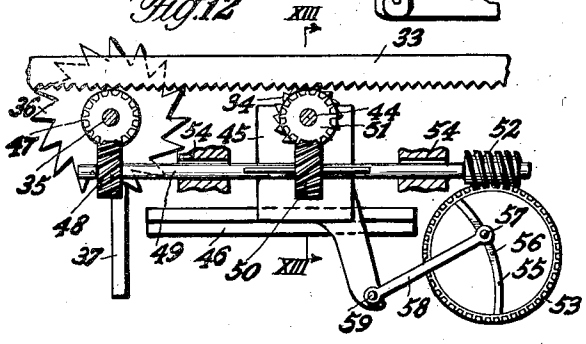


Fig.13

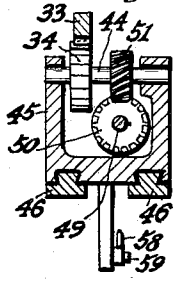


Fig.14.

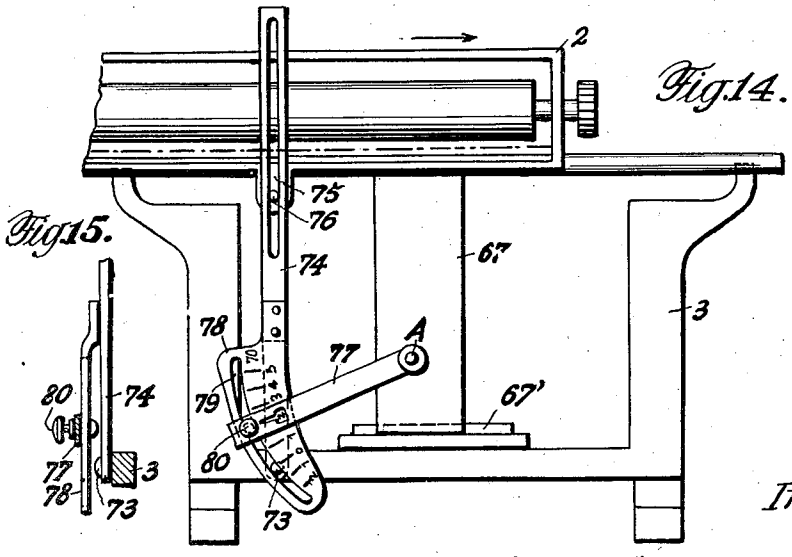


Fig.15.

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UNITED STATES PATENT OFFICE

2,296,881

TYPEWRITING MACHINE

Izso Szegö, Ernst Keszler, and Georg Kolozs, Kusnacht, Zurich, Switzerland, and Endre Turczay, Budapest, Hungary, assignors, by direct and mesne assignments, to Universag Technische A. G., Glarus, Switzerland, a corporation of Switzerland

Application November 21, 1939, Serial No. 305,490
In Hungary June 3, 1939

7 Claims. (Cl. 197—84)

The invention has reference to improvements in typewriting machines and particularly to a device for varying the length of each advancing or spacing step initially imparted to the writing sheet by the step-by-step movement of the platen carriage.

With normal typewriting machines the length of the spacing step of the carriage and thereby of the writing sheet is constant. In order to equalize the lengths of the typewritten lines, which normally differ somewhat from each other, and to cause all ends of the lines to be in alignment so that the typewritten text has in this respect the appearance of a printed page, it has already been proposed to vary the length of the spacing steps by means of exchangeable racks provided on the platen carriage. Typewriting machines of this type are special constructions which are expensive, complicated and unreliable in the working.

The main object of the present invention is to provide a device which permits its being adjusted to any desired variation of the length of the spacing step imparted to the writing sheet, which spacing step remains constant during the writing of the respective line, and to provide a device which is of a simple design and works reliably.

Another object of the invention is to provide a device which is constructed as a unitary structure attachable to existing typewriting machines.

The device according to the invention comprises motion transmitting means obtaining their impulse from the movement of the carriage and being adjustable at will to vary the lengths of the spacing step imparted to the writing sheet to correspond to a predetermined value.

The motion transmitting means may vary the function of any of the members influencing the spacing step, for instance of the rack, the pinion, the position of the escapement mechanism etc. or they may vary the position of the writing sheet relatively to the platen.

The variation of the length of the spacing step imparted to the writing sheet may be effected by adding (or subtracting) to the length of every step of the advancing movement of the carriage, which step is not varied, an additional movement of the carriage or of the writing sheet, the amount of this movement being adjustable, or by varying the length of each spacing step of the carriage movement itself by this adjustable additional amount.

Further objects of the invention will appear from the following description and the invention will be fully set forth therein and particularly pointed out in the appended claims.

Several constructional examples of the subject matter of the present invention are illustrated on the accompanying drawings, in which:

Figs. 1–8 show a first embodiment, in particular:

Fig. 1 shows a typewriting machine with the device attached in a perspective view and seen from the rear side;

Fig. 2 shows in elevation the motion transmitting means built to form a unitary structure, a cover plate being omitted from the casing;

Fig. 3 is a vertical section along line III—III in Fig. 2;

Fig. 4 is a horizontal section along line IV—IV in Fig. 2;

Fig. 5 is a horizontal section along line V—V in Fig. 2;

Figs. 6–8 show in a diagrammatic manner the transmission means in different operative positions;

Fig. 9 shows a modification of the transmission means shown in Figs. 2–8 and permitting to obtain a reduction of the length of the spacing steps;

Fig. 10 shows diagrammatically a further constructional example in which the lengths of the spacing step is varied by the alteration of the position of the sheet of paper;

Fig. 10A is a fragmentary sectional view showing a modification of the construction illustrated in Fig. 10;

Fig. 11 is a detail of Fig. 10;

Fig. 12 illustrates a further constructional example in which the position of the pinion of the escapement mechanism cooperating with the rack is altered;

Fig. 13 is a vertical section along line XIII—XIII in Fig. 12;

Fig. 14 illustrates diagrammatically a further constructional example, and

Fig. 15 is a detail of Fig. 14.

In the first embodiment of the invention illustrated in Figs. 1–8 the variation in the length of the spacing steps is obtained by the transmission means causing an additional displacement of the carriage relatively to the rack, the latter being endwise displaceably mounted in the carriage to permit such displacement.

The transmission means are mounted in a casing **1** fixed as a unitary structure to the platen carriage **2** of a typewriting machine. **3** denotes the frame of the latter. In the carriage **2** a shaft **4**, disposed in the longitudinal direction of the carriage, is mounted; a screw wheel **5** being axially displaceable on the shaft **4** but not turnable relatively to the shaft **4**; to this end the latter may have a square profile. The

screw wheel 5 is retained in its position relatively to the frame 3 by means of a bifurcated support 6, 7. Further a pinion 8 is mounted on the shaft 4 and is detachably connected to the latter by means of a screw 9. The screw wheel 5 cooperates with a rack 10 fixed to the carriage, whereby the longitudinal movement of the carriage causes a rotation of the screw wheel 5 and thereby a rotation of the shaft 4 and of the pinion 8. The pinion 8 cooperates with a rack 11 which is displaceable in a vertical direction in guide means 12 of the casing 1 (Figs. 2–5). A pin 13 is fixed on the rack 11 and projects through a slot 14 of the cover of the casing 1 and cooperates with a slot 15 of a link 16. A fulcrum or pin 17 is fixed to a plate 18 horizontally displaceable along guide means 19 and provided with an index 20. The pin 17 projects into the slot 15 of the link 16. Furthermore a bell crank lever having arms 22 and 23 is turnable about a pivot 21 of the casing 1 and the arm 23 is linked to the link 16 by means of a pin 24.

The index 20 is movable over an endless band 25 carrying a plurality of scales or graduations which, by turning the knob 26, can be brought one after the other into a position in which the zero point of the graduation coincides with the index 20 moved into the extreme right position. In this position of the index 20 the arm 23 of the bellcrank lever is parallel to the guide means 19 and the centers of the two pins 17 and 24 coincide. The large numeral on each scale indicates the number of steps per line, for instance 70 in Figs. 6–8, and the small numerals indicate the length expressed in numbers of spacing steps by which the line to be written has to be increased.

In order to effect this increase of the length of each individual spacing step a guide bar 27 is rigidly fixed in the carriage 2 and extends in the longitudinal direction of the latter. The guide bar 27 is provided with slots 29 and 30, respectively, into which pins 31 and 32, respectively, project, which pins are fixed to the rack 33 of the carriage 2. However the rack 33 is not rigidly fixed to the carriage as is customary but is endwise displaceable relatively to the carriage. The rack 33 is connected to the arm 22 of the bellcrank lever by means of a rod 28. With the rack 33 the usual pinion 34 cooperates, the latter being arranged on the same shaft 35 as the wheel 36 of the escapement mechanism. The dog 37 cooperates with the escapement wheel 36 and the dog 37 is swung out of its locking position when one of the keys is depressed and permits the turning of the pinion 36 and of the escapement wheel 34 by one tooth i. e. by one spacing step. When the platen carriage 2 moves by this spacing step the rack 10 is displaced in the longitudinal direction of the carriage together with the latter whereby a turning motion of the screw wheel 5, the shaft 4 and the pinion 8 is caused. The latter causes a downward movement of the rack 11 and thereby an angular displacement of the link 16.

When the index 20 is in the zero position the angular displacement of the link 16 does not influence the bell crank lever 22, 23, as the axes of the pin 17 between index plate 18 and link 16 and of the pin 24 between link 16 and arm 23 coincide, as shown in Fig. 6. The carriage remains thus in its normal position during the zero adjustment of the index.

When the index 20 is moved to a division of the scale for 70 steps for instance to 4, the pin 17 is moved along the slot 15 of the link 16 as shown in Fig. 7. The pin 17 acts now as pivot to the link 16 when the rack 11 is moved in the downward direction upon the movement of the carriage and the pin 13 of the rack acts upon the link 16. Thereby the pin 24 cooperating with the arm 23 of the bell crank lever causes a turning movement of the latter about the pivot 21 as illustrated in Fig. 8.

As the rack 33 is fixed in its position relatively to the machine frame 3 by the action of the pinion 34 and of the escapement wheel 36 the pivot 28' is a point in a fixed relation to the frame. The turning movement of the bell crank lever 22, 23 causes a displacement of the pivot 21, towards the left in Fig. 8 and the displacement of the pivot 21 causes a similar displacement of the carriage. The rack 33 permits this displacement as it is slidably mounted in the carriage.

In this manner to the movement of the carriage, permitted by the escapement mechanism, a second movement is added which influences in a variable manner (depending on the adjustment of the transmission means) the position of the writing sheet relatively to the writing point of the types, i. e. the length of the spacing step imparted to the writing sheet is altered. Every step determined by the rack and escapement mechanism is thus increased by an increment the amount of which depends on the adjustment of the index on the scale, so that at the end of the movement of the carriage, i. e. at the end of the line, the latter has been lengthened by the extent of 4 spacing steps in the example shown. For sake of clearaness Fig. 8 shows the total displacement at the end of the line, i. e. by a stretch corresponding to four spacing steps.

The connection of the pinion 8 with the shaft 4 is released by means of a screw 9 if for example the initial position of the carriage does not coincide with the left hand end of the lines but if a point intermediate of the ends of the line has to be chosen as the left hand starting point of a line. In order to prevent a displacement of the transmission means during the movement of the carriage into the new starting position the fixation of the pinion 8 on the shaft 4 is released and is made again after the carriage has reached its new starting position.

The aforementioned embodiment of the invention is intended for any desired increase of the spacing step; the latter may, however, be increased or decreased as is diagrammatically illustrated in Fig. 9. The device illustrated in Fig. 9 differs from that shown in Figs. 2–8 only in as much as the link 16' is so much lengthened that an adjustment of the scale plate 18 beyond the zero point of the scale 25 towards the right is rendered possible. At the adjustment illustrated the pin 17 which acts as pivot to the link 16' is situated beyond the pin 24. When the rack 11 moves in the downward direction the turning motion of the bell crank lever 22, 23 is reversed as compared with Fig. 8 and the carriage is displaced to the right, the pivot 21 of the bell crank lever and thereby the carriage being pulled towards the right by the turning motion of the link 16', the spacing step is thus decreased.

In the above described constructional example the carriage is influenced by the transmission means contained in the casing 1 in order to ob-

tain an increase or a decrease of the extent of the spacing step movement. However, the carriage may also carry out the normal step-by-step movement controlled by the rack and the escapement device and the carrier of the writing sheet may effect the additional movement for varying the length of the spacing step. A constructional example to that end is diagrammatically illustrated in Figs. 10 and 11.

On the platen 38 a sleeve 39 is provided which is endwise displaceable but not turnable relatively to the platen, a projection 40 fixed to the sleeve 39 entering into an axial groove 41 of the platen. Upon reference to Fig. 11, it will be noted that a ring 43 is inserted into an annular groove 42 formed in the sleeve 39 and cooperates with the rod 28 of the transmission means in substantially the same manner set forth in connection with the embodiment of the invention shown in Figs. 2 to 8, inclusive. The ring 43 and the annular groove 42 permit the turning of the platen and the rod 28 displaces the sleeve 39 in the axial direction and thereby the writing sheet by the increments by which the length of the spacing steps has to be varied. Care must be taken that the means pressing the writing sheet against the sleeve 39 permit a displacement of the sheet in the axial direction of the platen.

This may, for instance, be attained by arranging the roller 38' pressing the writing sheet against the sleeve 39, to be endwise displaceable on its axis 38''.

The increase or decrease of the length of the spacing step of the carrier for the writing paper may also be obtained by displacing the pinion of the escapement mechanism cooperating with the rack of the carriage by the desired increments. A constructional example embodying such a construction is illustrated in Figs. 12 and 13.

In Figs. 12 and 13 33 denotes the normal rack of the carriage, 35 is the shaft of the escapement wheel 36 and 37 the dog cooperating with the latter. The pinion 34 is in this case not fixed on the shaft 35 of the escapement wheel as usual but is fixed on a shaft 44 mounted in a support 45 which is displaceable in guides 46 in the longitudinal direction of the carriage. On the shaft 35 of the escapement wheel a screw wheel 47 is mounted to be working in one direction of rotation and meshes with a screw wheel 48 fixed to the shaft 49. For the other direction of rotation a free wheel mechanism (not shown in the drawings) is provided in order to return the carriage into its starting position without it being necessary to turn the wheels back. On the shaft 49 a further screw wheel 50 is mounted to be axially displaceable but not rotatable relatively to the shaft 49; the screw wheel 50 meshes with a screw wheel 51 fixed to the shaft 44 of the pinion 34. Further a worm 52 fixed to the shaft 49 cooperates with a worm wheel 53. The shaft 49 is mounted in bearings 54 on the frame of the machine. The worm wheel 53 is provided with a groove 55 passing through the axis 56 of the worm wheel. A pin 57 cooperates with the groove and is situated at one end of a rod 58 the other end of which is connected at 59 to a projection of the support 45. The pin 57 is adjustable along the groove 55 which is an arc about the centre 59.

The manner of operation of the above described device is as follows: If the pawl or dog 37 is swung out of its locking position by depressing a key or the spacing key the escapement wheel 36 turns by one tooth and a similar turning is performed by the shaft 35 and the screw wheel 47. The screw wheel 48 transmits the turning motion to the shaft 49 and as the pair of screw wheels 50, 51 has the same transmission ratio as the pair of screw wheels 47, 48 the pinion 34 carries out the same turning movement as if it were mounted on the shaft 35. The turning of the shaft 49 causes by the intermediary of the worm 52 a turning motion of the worm wheel 53, say anticlockwise, and through the action of the groove 55, pin 57 and rod 58 the support 45 and thereby the pinion 34 is shifted in Fig. 12 towards the left by the desired variation of the spacing step, the length of the spacing step is thus increased. A further adjustment of the pin 57 along the groove 55 away from the axis 56 causes an increase of the displacement movement; if the pin 57 is adjusted to coincide with the axis 56 the pinion 34 is not displaced; an adjustment of the pin beyond the axis 56 in the downward direction in Fig. 12 causes a displacement of the pinion 34 in the opposite direction and thus a decrease of the length of the spacing step.

Figs. 14 and 15 illustrate a further constructional example in which the variation of the step is effected by a displacement of the support of the escapement mechanism.

2 denotes again the platen carriage and 3 the frame of the machine which is provided with guidances 67' for displacing the support 67. About the pivot 73 fixed to the frame 3 a one-armed lever 74 is turnable, which is provided with a slot 75 with which a pin 76 fixed to the carriage cooperates. To the support 67 an arm 77 is linked which may be angularly adjusted along a scale plate 78 fixed to the lever 74 and provided with a curved slot 79 which is a circle with the centre A. A pin 80 cooperates with the slot 79 and is adjustable along the slot 79 and fixable in its adjustd position. When the pin 80 is, for instance, adjusted to the division 2 of the scale, as is shown in the drawings, the movement of the carriage at each spacing step towards the left causes a displacement of the support 67 towards the left and thereby an increase of the spacing step. When the arm 77 is so adjusted that the pin 80 coincides with the pivot 73, i. e. to the 0-mark of the scale, no displacement of the support occurs; when the arm 77 is further turned in downward direction beyond the zero mark of the scale a displacement of the support towards the right and thereby a decrease of the spacing step is caused.

In order to use the typewriting machine provided with any of the above-described devices for varying the spacing step imparted to the writing sheet, the writing is first of all done with the device in its inoperative position. The written lines will be unequal in length and they have now to be rewritten to obtain equal lengths. If a line is short of say four letter-spaces and has a total number of 70 spaces the index of the device is adjusted to the division 4 of the 70-scale and each of the 66 spacing steps is thereby increased by an increment so that the 66 larger spacing steps will be equal to the 70 normal steps and the same length of the line will be obtained. In a similar manner a line which is too long by 2 spacing steps can be shortened by adjusting the device to decrease the spacing steps.

What we claim is:

1. In a typewriting machine, the combination with a carriage movable step by step and escape-

ment mechanism for the carriage, of motion transmitting means between the escapement mechanism and carriage adjustable to vary the length of each advancing step of the carriage, said motion transmitting means comprising, a lever pivotally mounted intermediate the ends thereof on the carriage for swinging movement relative to the latter and operatively connected at one end to the escapement mechanism, a second lever having one end pivotally connected to the opposite end of the first lever, a fulcrum for the second lever adjustable from a position in alignment with the pivotal connection between the ends of the levers to vary the leverage ratio, and means forming part of the motion transmitting means responsive to movement of the carriage for swinging the second lever about said fulcrum.

2. In a typewriting machine, the combination with a carriage movable step by step, of escapement mechanism for the carriage including a rack shiftable relative to the carriage, motion transmitting means between the escapement mechanism and carriage adjustable to vary the length of each advancing step of the carriage, said motion transmitting means comprising, a lever pivotally supported intermediate the ends thereof upon the carriage, a second lever having one end pivotally connected to one end of the first lever and having a fulcrum shiftable from a position in alignment with the pivotal connection between the ends of the levers to a position spaced from said pivotal connection to vary the leverage ratio from zero to a predetermined value, a connection between the opposite end of the first lever and rack of the escapement mechanism, and means forming part of the motion transmitting means responsive to advancing movement of the carriage for swinging the second lever about said fulcrum.

3. In a typewriting machine, the combination with a carriage movable step by step and escapement mechanism for the carriage, of motion transmitting means between the escapement mechanism and carriage adjustable to vary the length of each advancing step of said carriage, said motion transmitting means comprising a lever pivotally supported intermediate the ends on the carriage and having one end operatively connected to the escapement mechanism, a second lever having one end pivotally connected to the first lever at the end of the latter opposite the end connected to the escapement mechanism, a slide supported for sliding movement along a path parallel to the path of travel of the carriage and carrying a fulcrum slidably engaging the second lever and movable by the slide from a position in alignment with the pivotal connection between the levers to positions spaced different distances from said pivotal connection, and means forming part of the motion transmitting means responsive to movement of the carriage for swinging the second lever about said fulcrum.

4. In a typewriting machine, the combination with a carriage movable step by step and escapement mechanism for the carriage, of variable leverage means between the escapement mechanism and carriage comprising a lever pivotally mounted on the carriage intermediate the ends thereof and having one end operatively connected to the escapement mechanism, a second lever having one end pivotally connected to the end of the first lever opposite the end connected to the escapement mechanism, a fulcrum for the second lever mounted for sliding movement from a position in alignment with the pivotal connection between the levers to vary the leverage ratio, a slide operatively connected to the second lever for swinging the latter about the fulcrum, and means forming part of the variable leverage means operated by the carriage for moving said slide.

5. In a typewriting machine, the combination with a carriage movable step by step and escapement mechanism for the carriage including a rack supported for sliding movement relative to the carriage, of variable leverage means between the rack and carriage comprising, a lever pivotally mounted intermediate the ends thereof on the carriage and having one end operatively connected to said rack, a second lever having one end pivotally connected to the first lever at a point opposite the pivotal connection of the first lever to said rack, a fulcrum for the second lever slidably engageable with the latter for movement longitudinally of the same, a member supporting the fulcrum and slidable to vary the position of the fulcrum relative to the pivotal connection between said levers, and means forming part of the variable leverage means operated by the carriage for swinging the second lever about said fulcrum.

6. In a typewriting machine, the combination with a carriage movable step by step and escapement mechanism for the carriage, of variable leverage means between the escapement mechanism and carriage including a lever pivotally mounted on the carriage intermediate the ends and having one end operatively connected to the escapement mechanism, a second lever having one end pivotally connected to the first lever at the end of the latter opposite the end connected to the escapement mechanism, a fulcrum slidably engageable with the second lever for movement longitudinally of the latter, a member carrying the fulcrum and slidably mounted to vary the position of the fulcrum with respect to the pivotal connection between said levers, an indicating dial cooperating with said member to predetermine the position of the fulcrum, and means forming part of the variable leverage means responsive to movement of the carriage for swinging the second lever about the fulcrum.

7. In a typewriting machine, the combination with a carriage movable step by step and escapement mechanism for the carriage including a rack slidably mounted relative to the carriage, of variable leverage means between the rack and carriage comprising a bell crank lever pivotally mounted intermediate the ends on the carriage and having one arm operatively connected to the rack, a second lever having one end pivotally connected to the other arm of the bell crank lever, a fulcrum for the second lever slidably engageable with the latter for movement longitudinally of the same to vary its position with respect to the pivotal connection between the levers, a rack connected to the second lever for swinging the latter about the fulcrum, a pinion meshing with said rack, and means responsive to movement of said carriage for rotating the pinion.

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