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TYPEWRITING MACHINE
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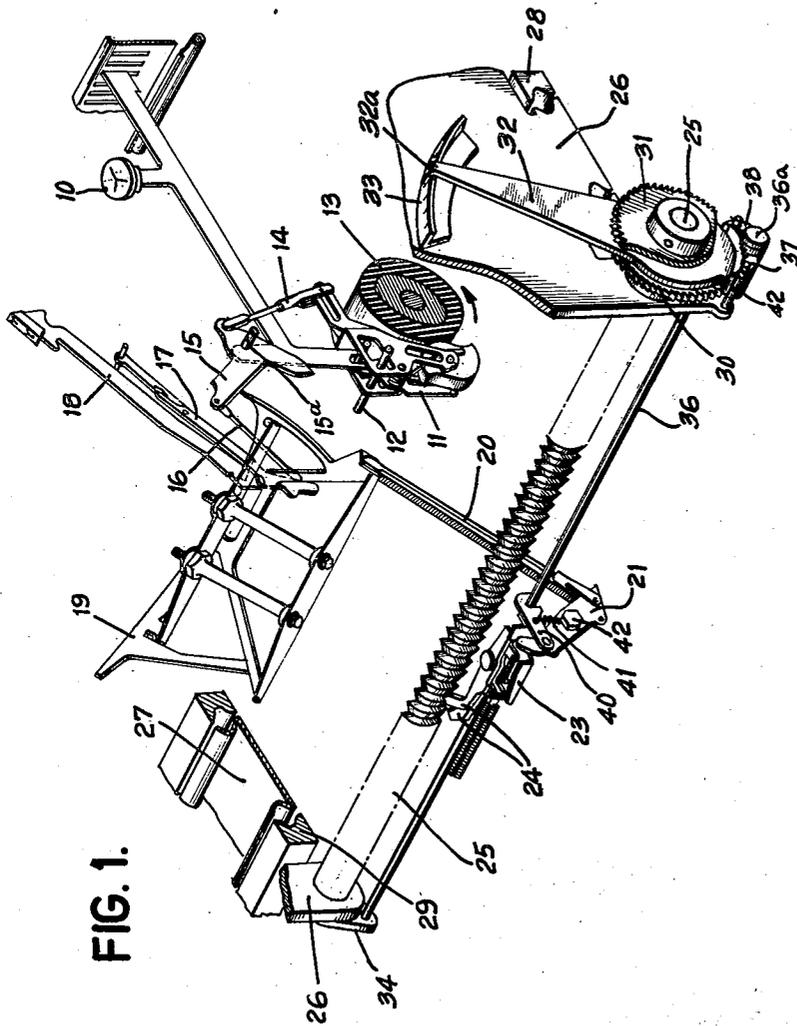


FIG. 1.

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TYPEWRITING MACHINE

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4 Claims. (Cl. 197—84)

This invention relates to typewriting machines.

The broad object of the present invention is to provide novel means for producing justified type-

5 written copy.

Another object is to provide a justifying device which is extremely simple and has few working parts.

10 An object is to provide a justifying mechanism which utilizes a carriage feed rack in the form of a worm in cooperation with a conventional escapement mechanism.

15 An object is to provide a justifying mechanism for typewritten lines which does not require multiple escapement mechanism, inclinable tracks, or complicated lever systems for obtaining a variable feed of the carriage.

20 Further objects of the instant invention reside in any novel feature of construction or operation or novel combination of parts present in the embodiment of the invention described and shown in the accompanying drawings whether within or without the scope of the appended claims and irrespective of other specific state-

25 ments as to the scope of the invention contained herein.

In the drawings:

Fig. 1 is a perspective view of the typing mechanism and portions of the carriage of a machine embodying the present invention.

Fig. 2 is a front elevation on a large scale of the mechanism for effecting justification.

Fig. 3 is a side elevation, partly in section, of the mechanism shown in Fig. 2.

30 In Fig. 1 there is shown diagrammatically a portion of typing mechanism and universal bar of the well known "International" electric writing machine, formerly known as the "Electromatic," together with portions of the carriage. While the present invention has been illustrated in the drawings and will be described herein as applied to the above machine, it is to be understood that it is not limited in its application to the specific machine or type of escapement mechanism selected for the purposes of illustration, but may be applied to other typewriting machines, whether manually or power operated, and may be used with other types of escapement mechanism.

40 The numeral 10 in Fig. 1 designates one of the character keys which, when depressed, causes a cam unit 11, pivoted on rod 12, to become operatively engaged with the power roller 13. The latter rotates constantly in the direction of the arrow when the machine is in use. Each cam

55 unit is connected by a link 14 to a sub-lever 15

pivoted on the rod 15a. The sub-lever 15 has a link connection 16 to one of a pair of toggle links 17 connected to the type bar 18. The engagement of the cam unit 11 with the power roller 13, as is well known in the art, causes the cam unit to become rocked in a clockwise direction (Fig. 1) thereby, through the link 14, similarly rocking the sub-lever 15. The type bar 18 is thus operated through the link connection 16 to the sub-lever 15 and prints on a work sheet on the platen (not shown) through the usual inking ribbon.

When the type bar is very close to the printing point, it engages the universal bar 19 and moves it in a direction downwardly and to the left in Fig. 1. The universal bar 19 is connected by a link 20 to a lever 21 which is pivoted on a stud 22 fixed relative to the machine frame. Thus, each time a type bar 18 is operated, the lever 21 is rocked in a clockwise direction (Fig. 1) on stud 22, thereby operating the escapement 23. The latter is of the form described in Patent No. 1,994,544 comprising two pawls 24 which alternate in engagement with the teeth of the escapement rack 25. It will be understood that the usual spring motor is provided which always tends to draw the carriage to the right in Figs. 1 and 2. With the exception of the escapement rack 25, which is herein shown as taking the form of a screw or worm, the mechanism so far described is old and well known in the art.

30 The escapement rack 25 is rotatably mounted in the end plates 26 of the carriage which plates are integrally joined by the channel-shaped member 27. The latter is formed with grooves in which ride the usual carriage supporting anti-friction roller trucks cooperating with grooves in the front rail 28 and the rear rail 29 which are rigidly mounted on the frame of the machine. Assuming, for the moment, that the rack 25 remains fixed against rotation in its bearings in the plates 26, the depression of any character key 10 will cause the type bar 18 associated therewith to operate as described above, thereby, through the universal bar 19, link 20, and lever 21, operating the escapement mechanism 23. The pitch of the threads on the rack 25 is the same as the pitch of the teeth on the rack disclosed in the above patent, whereby the carriage will be uniformly spaced one-tenth of an inch in the case of a pica machine, or one-twelfth of an inch in the case of an elite machine, for each character typed and for each operation of the space bar (not shown).

In the preparation of justified typewritten copy, it is usually necessary to first type the copy

in a rough-draft form on relatively cheap paper, trying, so far as possible, to terminate each line as close to the desired margin as possible. The rough draft thus obtained is re-copied on higher grade paper and, in order to justify the lines it is necessary, to vary the spacing of the characters so as to increase or decrease the spacing to an extent which will cause those lines which do not terminate at the desired margin to expand or contract to the extent necessary to cause them to terminate at the margin.

It has been discovered that by both operating the escapement 23 in the usual way and by rotating the rack 25 the spacing may be automatically increased or diminished according to the direction of rotation of the rack. In order to effect the rotation of the rack, there is provided a ratchet and pawl mechanism at one end of the carriage, which is best shown in Figs. 2 and 3. Adjacent one of the end plates 26 of the carriage there is secured to the worm 25 a pair of ratchets 30 and 31 having closely spaced teeth which face in opposite directions. Loosely mounted between the ratchets 30, 31 is a control lever 32 which has a pointer 32a formed in the free end thereof cooperating with a scale 33 secured to the adjacent plate 26. The control lever 32 is so shaped as to constitute a cam 32b having a high portion 32c and two low portions 32d and 32e. Loosely mounted on rack 25 adjacent the plates 26 are two arms 34 (Fig. 1) and 35 (Figs. 2 and 3), which arms, with a rod 36, constitute a bail which is rockably mounted in the plates 26 with rack 25 as a pivot. The arm 35 has a stud 36a on which are mounted two feed pawls 37, 38 facing in opposite directions and interconnected between the stud 36a and the rack 35 by a spring 39, whereby the pawl 37 tends to engage the ratchet wheel 30 and the pawl 38, the ratchet wheel 31. The lever 21 has a link 40 (Fig. 1) connected thereto and said link is provided with a slot embracing the rod 36, the link 40 being held in engagement with rod 36 by a spring 41.

It is apparent from Fig. 1 that every time the escapement is operated the bail, comprising arms 34, 35 and rod 36, will be oscillated from the position shown in Fig. 3 to the right and back. The pawls 37, 38 are wide enough to engage both their respective ratchets and the cam 32b whereby said cam controls the engagement of the pawls 37, 38 with the respective ratchets.

With the hand lever 32 set in the zero position of scale 33 in Fig. 3, the pawls 37, 38 will merely ride idly over the periphery of the high part 32c of the cam 32b without engaging the teeth of either of the ratchets 30, 31. Thus, as long as the lever 32 remains in the zero position, the escapement mechanism will cause the carriage to be moved with the standard spacing of one-tenth or one-twelfth of an inch according to whether the machine is a pica machine or an elite machine.

If it should happen that the line as first typed terminates short of the desired margin, the normal spacing must be increased an extent which will bring the line flush with the margin. The graduations on the scale 33 indicate the number of letter spaces that the line is to be increased in order to make the line terminate flush with the margin. The words "Shorten" and "Lengthen" in Fig. 3, together with the arrows adjacent thereto, indicate in which direction the lever 32 must be moved to cause the typewritten line to terminate flush with the margin in the respective

cases where the line is too long or too short. For instance, if in re-typing the draft it is found that a given line is three letter spaces short of the marginal point, the lever 32 is moved in a clockwise direction until the index pointer 32a corresponds with the graduation designated "3." Conversely, if the line terminated the same distance beyond the margin, the lever 32 would be moved clockwise to the other graduation designated "3."

Taking the first case, where the line is too short by three units, the cam 32b will be positioned in a clockwise direction to permit the pawl 38 to engage the ratchet 31 and rotate it in a counterclockwise direction for a distance of three tooth spaces. Thus, when the line is typed, for each operation of the escapement mechanism in typing a letter the carriage will receive an additional feed owing to the fact that the rack 26 will be rotated an extent sufficient to increase the spacing of each letter by an amount necessary to cause the retyped line to terminate flush with the margin.

Taking the second case, where the line is too long and it is desired to decrease the spacing, the lever 32 is positioned in a counterclockwise direction to register with "8" on the scale. The cam 32b is rotated in a counterclockwise direction to an extent to permit the pawl 37, on the restoring movement of the bail including rod 35, to rotate the ratchet wheel 30 three tooth spaces. This will cause the rack 25 to rotate sufficiently to decrease the normal spacing an extent sufficient to cause the re-typed line to terminate flush with the margin.

It will be understood that one or the other of pawls 24 functions like the nut of a screw-feed escapement which supplements the escapement 23.

In order to prevent overthrow of the ratchets 30, 31 and the bail including rod 36, there are provided pins 42 at the terminating positions of the pawls 37, 38, which pins, in a well known way, tend to force the pawls deeper into the teeth of the ratchet and thereby prevent over rotation.

While there has been shown and described and pointed out the fundamental novel features of the invention with reference to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the invention illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is as follows:

1. In combination with the carriage of a typewriting machine, escapement mechanism including an escapement rack in the form of a worm, means to operate the escapement mechanism, means connected with the operating means for automatically rotating the worm each time the escapement mechanism is operated, and means including a control lever for determining both the extent of rotation and the direction of rotation of the worm.

2. In combination with the carriage of a typewriting machine, a pair of escapement pawls, a rack cooperating with the escapement pawls, said rack consisting of a worm, a ratchet and pawl device for rotating said worm, means to operate the escapement pawls and the ratchet and pawl device concomitantly, and a control lever for

controlling both the direction of rotation and the extent of rotation imparted to the worm by the ratchet and pawl device.

3. In combination with the carriage of a type-
5 writing machine, a rack rotatably mounted on
the carriage, a pair of ratchet wheels fixedly
mounted on said rack and having their teeth
facing in opposite directions, a bail mounted
on the carriage for oscillatory movement, a pair
10 of pawls each engaging one of said ratchet wheels
and mounted on the bail, a cam lever for control-
ling the engagement of the pawls with the
ratchets to both determine the extent and direc-
tion of rotation of said ratchets, a hand lever for
15 rotating said cam, a scale cooperating with said
hand lever, a conventional escapement mecha-
nism mounted independently of the carriage and
engaging said rack, and means for operating

both the escapement mechanism and oscillating
said bail during the course of the carriage move-
ment caused by an operation of the escapement
mechanism.

4. In combination with the carriage of a type- 5
writing machine, escapement mechanism there-
for, including feeding pawls, a feed screw ro-
tatably mounted in the carriage and functioning
as a rack in cooperation with said feed pawls,
means for operating the pawls to feed the car- 10
riage in cooperation with the screw, means con-
nected to the operating means for rotating the
screw to obtain a supplemental feed of the car-
riage independently of the feed effected by said
pawls, and means to control the rotation of the 15
feed screw whereby to vary the feed of the car-
riage.

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