July 7, 1959 H. HEINZE 2,893,532

JUSTIFYING MECHANISM FOR TYPEWRITERS AND THE LIKE

Filed Dec. 5, 1958 2 Sheets-Sheet 1

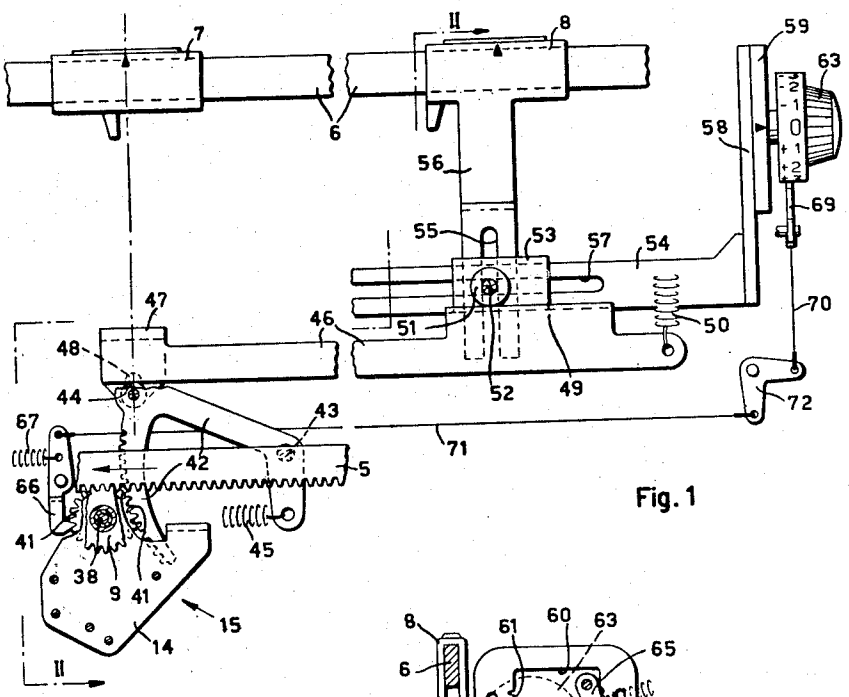


Fig. 1

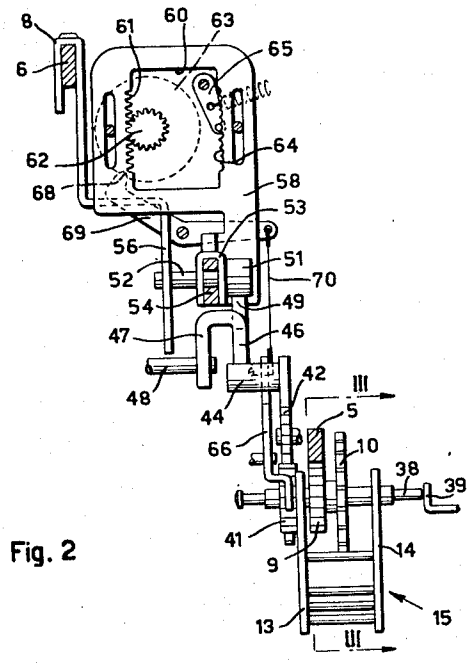


Fig. 2

INVENTOR.
HERBERT HEINZE

BY

Kenyon & Kenyon
ATTORNEYS

July 7, 1959 H. HEINZE 2,893,532

JUSTIFYING MECHANISM FOR TYPEWRITERS AND THE LIKE

Filed Dec. 5, 1958 2 Sheets-Sheet 2

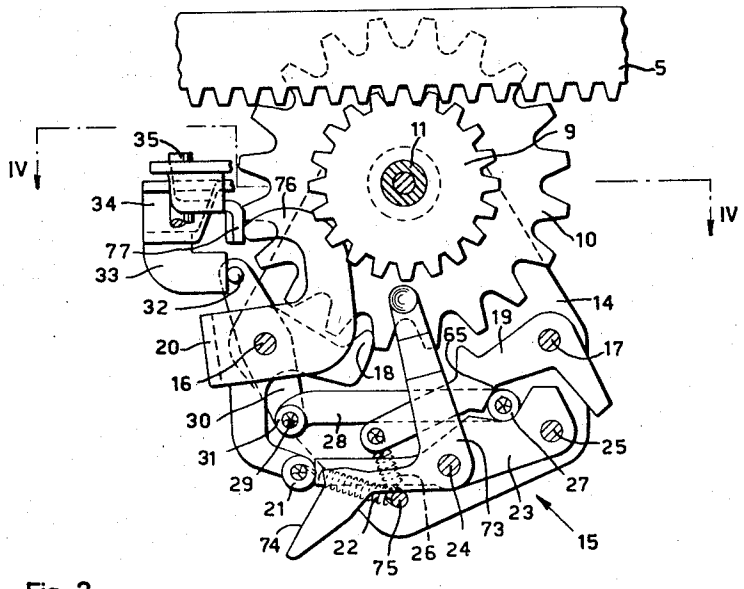


Fig. 3

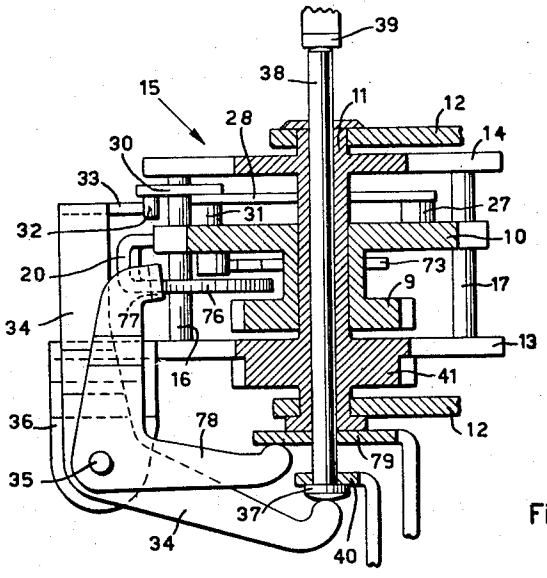


Fig. 4

INVENTOR.
HERBERT HEINZE

BY Kenyon & Kenyon

ATTORNEYS

United States Patent Office

2,893,532

Patented July 7, 1959

2,893,532

JUSTIFYING MECHANISM FOR TYPEWRITERS AND THE LIKE

Herbert Heinze, Vienna, Austria, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy, a corporation of Italy

Application December 5, 1958, Serial No. 778,472

Claims priority, application Austria, December 5, 1957

8 Claims. (Cl. 197—84)

This invention relates to typewriting machines and the like, having a carriage fed step by step by an escapement device mounted on the machine frame. More particularly, the invention concerns a justifying mechanism which, by altering the length of the letter spacing movement, completely justifies the lines of a typewritten document so that all the lines have a desired equal length and therefore, the ends of the lines adjacent the right hand margin of the document form a straight vertical line.

Various justifying mechanisms are known wherein a positive or negative increase of movement is added to the normal letter spacing movement for extending or shortening the length of the typewritten line.

The addition of said increase may be obtained by shiftably mounting the conventional letter spacing rack bar on the carriage and by gradually shifting said rack bar in either direction during the feed movement of the carriage.

A similar addition may be obtained by movably mounting the escapement mechanism on the machine frame and by gradually moving the escapement mechanism during the feed movement of the carriage.

In a known justifying mechanism of this type, the escapement mechanism comprises an escapement wheel and a support for a means engageable with said wheel to control rotation thereof, said support being rotatably mounted on the shaft of a pinion cooperating with the carriage rack bar, said wheel being mounted on said support for engaging said pinion and revolving about said shaft in the same manner as a planetary wheel of the sun gear of a differential mechanism. This prior art justifying mechanism possesses various disadvantages as, for example, a great momentum and some difficulties in operating the movable escapement mechanism.

It is the object of the present invention to provide an improved justifying mechanism of the type having a rotatable escapement support.

With this and other objects in view, according to the present invention, in a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, means engageable with said wheel for controlling rotation thereof, and a support for said means, I now provide a justifying mechanism comprising means for rotatably mounting said support on said machine frame coaxially with said wheel, and settable means for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase.

Further objects, features and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a frontal view of a justifying mechanism according to the invention, as embodied in a typewriting machine;

Fig. 2 is a left-hand sectional view of the mechanism taken on line II—II of Fig. 1;

Fig. 3 is a detailed sectional rear view of the escapement device of the machine taken on line III—III of Fig. 2, on an enlarged scale;

Fig. 4 is a sectional view of the escapement device taken on line IV—IV of Fig. 3.

With reference to the drawings, the numeral 5 indicates the conventional rack bar of the paper carriage of the typewriting machine. The rack bar 5 is secured to the carriage and is constantly urged leftwards (Fig. 1) by any suitable mechanism, as for example, by a spacing spring barrel and draw band of known construction, not shown in the drawings. Further secured to the carriage is a rack bar 6 slidably supporting the conventional margin stops 7 and 8 of the carriage.

The rack bar 5 meshes with a pinion 9 secured to an escapement wheel 10 (Figs. 2 and 4) rotatably mounted on a hub 11, which in turn is rotatably mounted on the machine frame 12. Secured to the hub 11 are two plates 13 and 14 forming therewith a rotatable support generally indicated by the numeral 15, which is mounted coaxially with the wheel 10.

Secured to the support 15 parallelly with the hub 11 is a pair of pivots 16 and 17 (Fig. 3) for pivotally supporting a pair of escapement dogs 18, 19, respectively, adapted to alternately engage the wheel 10. The dog 18 normally engages the wheel 10. The lower arm of the dog 18 is provided with a roller 21 which is urged by a spring 22 to contact a plate 23 secured to two pins 24 and 25 of the support 15. The dog 19 is normally disengaged from the wheel 10 and is urged by a spring 26 to contact a roller 27 of a link 28 contacting in turn the upper edge of the plate 23.

The link 28 by means of a pin 29 is connected to a lever 30 fulcrumed on the pivot 16. A roller 31 rotatably mounted on the pin 29 is adapted to cooperate with the lower arm of the dog 18. The lever 30 is provided with a pin 32 cooperating with a bent lug 33 of a lever 34 (Fig. 4) fulcrumed at 35 on a bent lug 36 of the plate 13. The other arm of the lever 34 contacts the enlarged end portion 37 of a sliding member, such as a cylindrical rod 38 located in the hub 11 and axially movable by a lug 39 of a conventional universal bar operable in a known manner by the writing keys of the machine. Furthermore, the end portion 37 of the rod 38 may be likewise moved by a lug 40 controlled by the conventional space bar of the machine.

Secured to the hub 11 of the support 15 is a pinion 41 having a diameter and a pitch equal to the pinion 9. The pinion 41 normally meshes with a toothed member or sector 42 (Fig. 1) fulcrumed on a pivot 43 secured to the machine frame. The sector 42 is provided with a roller 44 urged by a spring 45 to contact the lower edge of suitable settable means, such as a rail 46.

The rail 46 is arranged on the carriage and is directly connected with at least one of the margin stops. In effect, the left hand end of the rail 46 is provided with a bent lug 47 rotatably mounted on a pivot 48 of the carriage, said pivot being preferably secured to a downward projection of the margin stop 7, not shown in the drawings, and being vertically aligned with the margin stop indicator. When the carriage is located in its right hand end position as defined by the margin stop 7, the edge of the roller 44 contacting the rail 46 is aligned with the axis of the pivot 48 which in turn defines the left hand end of the line to be written.

The right hand end of the rail 46 is provided with a projection 49 urged by a spring 50 to normally con-

tact a roller 51. The roller 51 is mounted on a pivot 52 (Fig. 2) of a reverse U-shaped slide 53 horizontally slidable on a bail 54. Furthermore, the slide 53 through the pivot 52 is crosswise guided both by a vertical elongated slot 55 provided in a projection 56 of the right margin stop 8 and by a horizontal elongated slot 57 provided on the bail 54, whereby the slide 53 will be defined as a cross slide.

The bail 54 is secured to a plate 58 vertically slidable on the right side frame 59 of the carriage. The plate 58 is provided with an aperture 60 having a toothed vertical edge 61 engaged with a pinion 62 which in turn is secured to a manipulative knob 63 settable according to the positive or negative increase of carriage movement required for justifying a typewritten line. To this end the knob 63 is provided with a set of marks according to the number of carriage steps forming the desired positive or negative justification increase. The other vertical toothed edge 64 of the aperture 60 cooperates with a spring actuated positioning lever 65 fulcrumed on the side frame 59 and adapted to keep the plate 58 in any set position.

If the knob 63 is in its zero position, the rail 46 is set in its horizontal position and does not affect the toothed sector 42 during the movement of the carriage, whereby the escapement support 15 will not be rotated.

Upon depression of a writing key or of the space bar, the rod 38 (Fig. 4) will be axially lowered by the lug 39 or by the lug 40, respectively. The end portion 37 of the rod 38 then rocks the lever 34 clockwise and the lug 33 in turn rocks the lever 30 clockwise (Fig. 3), whereby the roller 31 will push the lower arm of the dog 18 leftwards and disengage the dog 18 from the escapement wheel 10.

Simultaneously the roller 27 of the link 28 engages the inclined edge 65 of the dog 19 which is thus rocked clockwise to engage the wheel 10. Under the urge of the hereinabove mentioned spacing spring the wheel 10 together with the pinion 9 and the carriage will now be advanced to a first partial extent of the normal letter spacing step.

Upon releasing the depressed key or bar, by the urge of the springs 22 and 26 the rod 38 may return to rest, the dog 18 is reengaged with and the dog 19 is disengaged from the wheel 10, whereas the link 28, the levers 30, 34 and the rod 38 are returned to rest as well. The wheel 10 and the carriage are now advanced to a further partial extent of the normal letter spacing step as defined by the pitch of the wheel 10. The angle of rotation of the wheel 10 corresponding to said two extents thus represents the normal angle of rotation.

In order to justify a typewritten line the knob 63 is rotated to the mark corresponding to the number of normal spacing steps representing the positive or negative increase to be added to the length of a line.

More particularly, if the knob 63 is rotated clockwise (Fig. 2) the pinion 62 will move the plate 58 upwards and the bail 54 in turn will move the slide 53 upwards, whose pivot 52 (Fig. 1) slides along the vertical slot 55 of the projection 56. By the urge of the spring 50 the rail 46 is now rocked counterclockwise about the pivot 48 and is correspondingly inclined upwards.

During the feed movement of the carriage (leftwards in Fig. 1), under the urge of the spring 45 the roller 44 will follow the rail 46 and the sector 42 will gradually rotate the pinion 41 and the support 15 counterclockwise about the axis of the hub 11. It will thus be apparent that due to the coaxial arrangement of the support 15 and the wheel 10, for each carriage step the wheel 10 will directly add the normal angle of rotation according to the letter spacing movement with the variable positive angle of rotation according to the predetermined positive increase, the variable angle being defined by the inclination of the rail 46 and being adapted to extend the resulting carriage step in order to dully extend the length of the typewritten line.

Similarly, if the knob 63 is rotated counterclockwise (Fig. 2) the rail 46 is inclined downwards (Fig. 1), whereby during the feed movement of the carriage the sector 42 is rotated counterclockwise to gradually rotate the support 15 clockwise.

It will thus be understood that in this case for each carriage step the wheel 10 will directly add the normal angle of rotation with the variable negative angle of rotation according to the predetermined negative increase, the variable angle being adapted to shorten the resulting carriage step in order to duly shorten the length of the typewritten line.

Of course, the shorter the length of the justified line the greater will be the inclination of the rail 46 to add a predetermined increase. By moving the margin stop 8 along the rack 6, the projection 56 by means of the pivot 52 will move the slide 53 along the bail 54. The inclination of the rail 46 is thus altered according to the length of the line.

It is to be remarked that the knob 63 and the margin stop 8 should be moved only if the carriage is in the left hand end position wherein the roller 44 is aligned with the pivot 48 of the rail 46, whereby the latter when changing its inclination does not affect the position of the support 15.

In order to prevent any accidental rotation of the support 15 when the carriage is conditioned for normal letter spacing, the support 15 is normally locked in its zero position by a hook 66 (Fig. 1) engaging the pinion 41 by the urge of a spring 67. The hook 66, by the intermediary of a pull rod 71, a lever 72 and a pull rod 70, is connected to a lever 69 engaging a peripheral recess 68 (Fig. 2) of the knob 63 when the latter is in its zero position. If the knob 63 is rotated in either direction from its zero position, the lever 69 is rocked counterclockwise and will disengage the hook 66 from the pinion 41.

To silence the escapement dog 18 during carriage return, a lever 73 is pivoted on the pin 24 of the support 15 and by means of its upper arm so contacts the wheel 10 as to be frictionally rotatable thereby. When the carriage is advancing (rightwards in Fig. 3) the lever 73 is rotated counterclockwise until contacting a pin 75 of the support 15, without affecting the dog 18. When the carriage is returned the lever 73 is rotated clockwise and its inclined edge 74 acts upon the roller 21, thus disengaging the dog 18 from the wheel 10 and preventing the dog from ratcheting over the teeth of the wheel.

For manually moving the carriage the dog 18 is also disengageable from the wheel 10, while the dog 19 remains disengaged. To this end the bail 20 of the dog 18 is provided with an arm 76 adapted to be operated by a lug 77 of a lever 78 pivoted at 35 on the lug 36 of the support 15. The lever 78 cooperates with a bent lug 79 axially slidable on the rod 38 under the action of the conventional carriage release lever, not shown in the drawings. By operating the carriage release lever the lug 79 is moved downwards (Fig. 4) and will rotate the lever 78 clockwise. The lug 77 of the lever 78 will now disengage the dog 18 from the wheel 10, irrespective of the actual position of the support 15.

From the foregoing description it will be understood that many changes may be made in the above construction, and different embodiments of the invention could be made without departing from the scope thereof. It is, therefore, intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative, and not in a limiting sense.

What I claim is:

1. In a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably

mounted on said machine frame, means engageable with said wheel for controlling rotation thereof, and a support for said means, a justifying mechanism comprising means for rotatably mounting said support on said machine frame coaxially with said wheel, and settable means for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase.

2. In a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, a pair of escapement dogs alternately engageable with said wheel for controlling rotation thereof, a support for said dogs, and a pair of parallel pivots for said dogs secured to said support, a justifying mechanism comprising means for rotatably mounting said support on said machine frame parallelly with said pivots, settable means for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, and means for rotatably mounting said wheel coaxially with said support, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase.

3. In a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, means operable for alternately engaging said wheel to control rotation thereof, and a support for said means, a justifying mechanism comprising means for rotatably mounting said support on said machine frame coaxially with said wheel, settable means for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase, and an axially sliding member for operating said engaging means, said member being coaxial with said wheel and said support.

4. In a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, a pair of escapement dogs operable for alternately engaging said wheel to control rotation thereof, a support for said dogs, and a pair of parallel pivots for said dogs secured to said support, a justifying mechanism comprising means for rotatably mounting said support on said machine frame parallelly with said pivots, settable means for rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement for purposes of justification, and means for rotatably mounting said wheel coaxially with said support, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase, and an axially sliding member for operating said engaging means, said member being coaxial with said wheel and said support.

5. In a typewriting machine having a machine frame, a movable carriage and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, means engageable with said wheel for controlling rotation thereof, and a support for said means, a justifying mechanism comprising means for rotatably mounting said support on said machine frame coaxially with said wheel, and a variably inclinable element on said carriage for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase.

6. In a justifying mechanism as defined by claim 5, a pinion secured to said support coaxially therewith, and a toothed member pivoted on the machine frame and meshing with said pinion, said element being formed as a rail slidably engaging said toothed member.

7. In a typewriting machine having a machine frame, a movable carriage, a pair of margin stops on said carriage, at least one of said stops being slidable thereon for limiting the length of a typewriter line, and an escapement mechanism for normally letter spacing said carriage, said escapement mechanism comprising an escapement wheel rotatably mounted on said machine frame, means engageable with said wheel for controlling rotation thereof, and a support for said means, a justifying mechanism comprising means for rotatably mounting said support on said machine frame coaxially with said wheel, a variably inclinable element pivoted at one end on said carriage for gradually rotating said support during the letter spacing movement of said carriage to variably increase the amount of said movement, said wheel being adapted to directly combine the normal angle of rotation according to the letter spacing movement with the variable angle of rotation according to said increase, and a cross slide connection between the other end of said rail element and said slidable margin stop.

8. A justifying mechanism as defined by claim 7, characterized in that said one end of said element is pivoted on the other margin stop.

References Cited in the file of this patent

UNITED STATES PATENTS

2,018,547	Colton	Oct. 22, 1935
2,133,973	Colton	Oct. 25, 1938
2,296,881	Szego et al.	Sept. 29, 1942