Aug. 11, 1931. R. H. MANLY 1,818,078

UNDERSCORING APPARATUS FOR TYPEWRITERS

Filed Nov. 9, 1929

Fig. 1

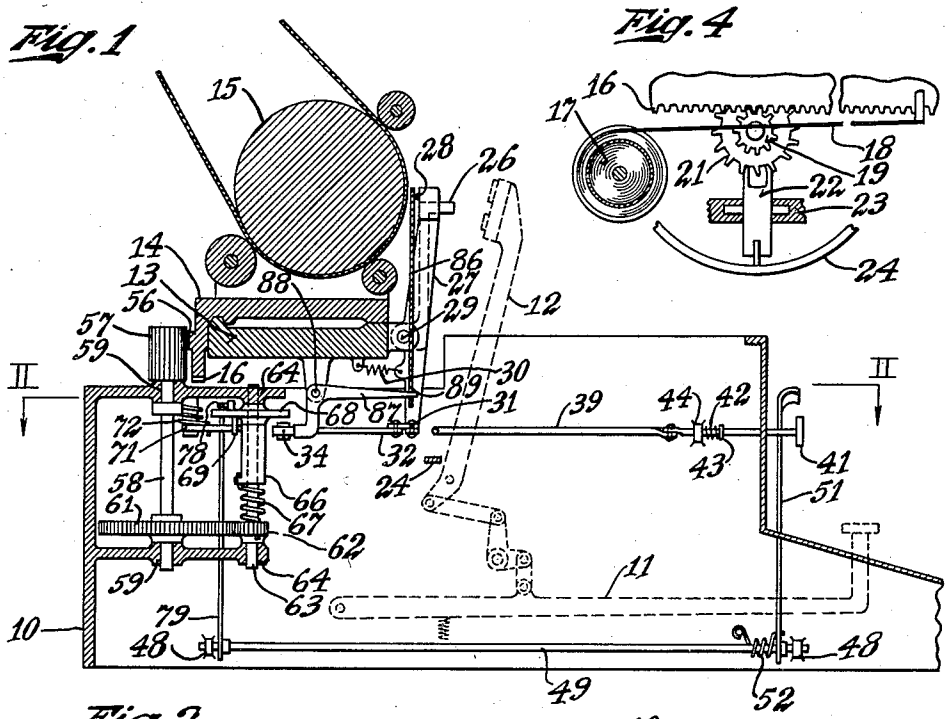


Fig. 4

Fig. 2

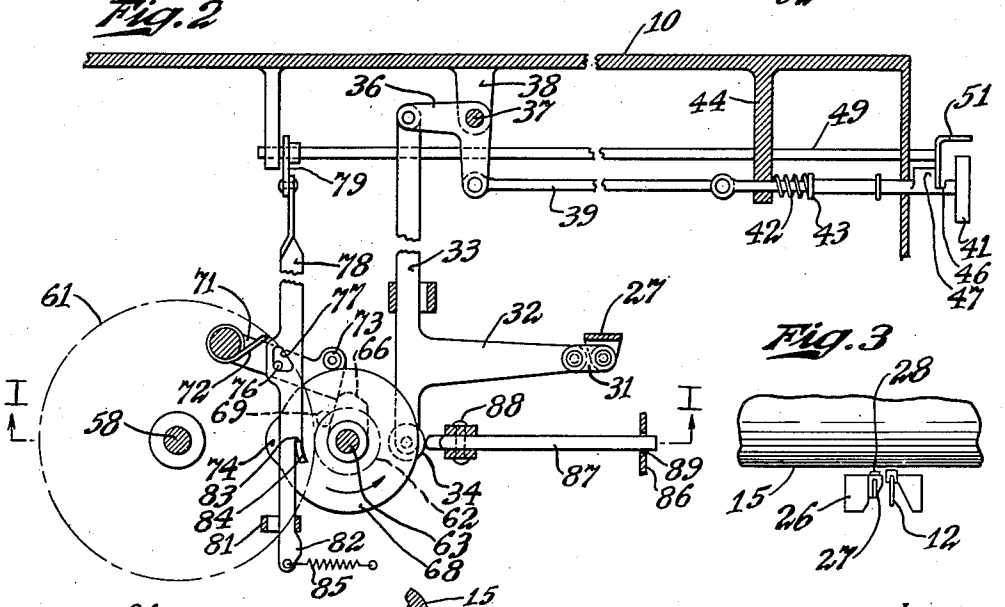
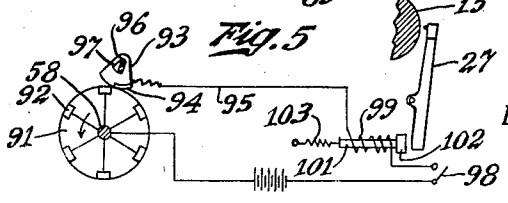


Fig. 3

Fig. 5



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UNITED STATES PATENT OFFICE

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UNDERSCORING APPARATUS FOR TYPEWRITERS

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My invention relates to typewriters, more particularly to an underscoring apparatus therefor, and has for its object the provision of apparatus of the character designated which shall be simple of construction, reliable in operation, and which shall be effective to underscore a line of writing simultaneously with the typing of the line.

A further object of my invention is to provide an underscoring type bar mounted on the typewriter adjacent the striking point of the regular type bars, together with means for selectively operating the underscoring type bar in response to movement of the typewriter carriage when operating the usual type bars.

A still further object of my invention is to provide an underscoring type bar pivotally mounted on the undercarriage of a typewriter with its upper end positioned before the platen to one side of the striking point of the usual type bars, together with means responsive to movement of the platen carriage for striking the underscoring type bar as the platen carriage comes to rest after the operation of the usual type bar.

A further object of my invention is to provide an underscoring type bar for a typewriter, together with means for operating the type bar in response to movements of the platen carriage, whereby a continuous line of characters may be typed across a page by movement of the platen carriage, such for example, as by means of tabulator mechanism.

As is well known, in manuscript writing on a typewriter, it often occurs that it becomes necessary to underscore words or lines. With typewriters as usually constructed, it is necessary to first type the line and then go back over the work to underscore it. In accordance with my invention, I have provided a mechanism whereby the underscoring of words or sentences may be carried out simultaneously with the typing of the words to be underscored. In carrying out my invention, I provide a special underscoring type bar and pivotally mount the bar on the undercarriage of the typewriter to one side and in advance of the striking point of the usual type bars. The lower end of the underscoring type bar extends below the carriage and there is provided underneath the carriage a mechanism which may be selectively brought into operation whereby the lower end of the underscoring type bar is struck a blow just as the platen carriage is coming to rest after moving in response to the operation of the usual key levers. The striking of the underscoring key lever may be accomplished by mechanical means operable in response to movement of the platen carriage or by electrical means also operable in response to movement of the platen carriage.

Apparatus embodying features of my invention is illustrated in the acompanying drawings forming a part of this application, in which

Fig. 1 is a sectional view of a typewriter equipped with my invention taken along the line I—I of Fig. 2;

Fig. 2 is a sectional view taken along the line II—II of Fig. 1;

Fig. 3 is a fragmentary plan view showing the position of the underscoring character with reference to the type bar guide;

Fig. 4 is a conventional view of escapement mechanism for the platen carriage; and

Fig. 5 is a diagrammatic view showing an electrical means for operating my invention.

Referring to the drawings for a better understanding of my invention, I show a typewriter embodying a frame 10 and only such other parts thereof as are necessary to an understanding of my invention. The typewriter is equipped with the usual key levers 11 and type bars 12 operable by the key levers. At 13 is shown the undercarriage of the typewriter, the undercarriage being shown in its raised position, it being understood that it may be raised and lowered by any suitable means and which forms no part of my present invention. Mounted on the undercarriage 13 is a platen carriage 14 with a platen 15 which is adapted to be moved from side to side on the undercarriage 13. To this end, the platen carriage 14 is provided with a depending rack 16 having connected thereto a coil spring 17 through

a tape 18, the spring 17 serving to pull the platen carriage from right to left and the carriage being movable by hand in opposition to the spring 17, as is well understood.

A conventional escapement mechanism for controlling the platen carriage 14 is shown in Fig. 4 and comprises a pinion 19 meshing with a rack 16 and an escapement wheel 21 rotatable with the pinion 19. Engaging the escapement wheel 21 is an escapement pawl 22 pivoted to some suitable part at 23 and operable by means of a universal bar 24 which is struck by the type bars 12 every time one of the type bars is operated.

Mounted on the undercarriage 13 in front of the platen 15 is a type bar guide 26 which, in accordance with my invention, is made wider than the usual type bar guide as may be seen in Fig. 3. Mounted in the type bar guide 26 is an underscoring type bar 27 carrying an underscoring character 28. The type bar 27 being located to the left of the striking point of the regular type bars 12 and shaped to normally form a part of the type bar guide 26. The underscoring type bar 27 is pivotally mounted intermediate its ends at 29 to the undercarriage 13 so as to always occupy the same relative position vertically with respect to the platen 15.

The underscoring type bar 27 is normally held out of contact with the platen 15 by means of a relatively light spring 30. Connected to the lower end of the underscoring type bar 27 is a link 31 which in turn is connected to an arm 32 of a striker bar 33. The striker bar at its inner end has mounted therein a roller 34 and is connected at its other end to a bell crank 36 mounted at 37 on a lug 38 on the frame 10. Connected to the bell crank 36 is a push rod 39 having a push button 41 mounted on its outer end. Surrounding the push rod 39 is a spring 42 which bears against a shoulder 43 on the rod 39 and a lug 44 on the frame 10 so that the push rod 39 is normally biased to an outward position. Formed near the outer end of the push rod 41 is a notch 46 and a shoulder 47 adjacent the notch.

Mounted in brackets 48 on the frame 10 is a rock shaft 49 carrying a latch arm 51. Surrounding the rock shaft 49 is a coil spring 52 engaging the latch arm 51 so that it bears against the outer end of the push rod 39 at all times. When the push rod 39 is shoved inwards by means of the button 41, to move the roller 34 into position as will be described later, the latch arm 51 drops into the notch 46 and holds the push rod in its inward position. When the latch 51 is removed out of the notch 46, the spring 42 shoves the push rod 39 outwards to its original position, the latch then riding on the shoulder 47.

Formed on the platen carriage 14 is a second rack 56 which meshes with a pinion 57 carried by a shaft 58 mounted in suitable bearings 59 in the rear of the frame 10. On the lower end of the shaft 58 is a gear 61, and meshing with the gear 61 is a pinion 62. The pinion 62 is mounted on a countershaft 63 journaled in bearings 64 in the frame 10. The gear ratio between the pinion 57, and the gear 61 and pinion 62 is such that the pinion 62 makes one revolution for each movement of the platen carriage 14 in response to operation of one of the key levers 12. Journaled on the shaft 63 is a hammer member 66 which is connected with the pinion 62 by means of a spring 67. Mounted on the upper end of the shaft 63 is a cam 68 having mounted therein a pin 69 which is adapted to engage the hammer 66 and limit its rotary movement with respect to the pinion 62 and cam 68.

Pivotally mounted on the frame 10 is a pawl 71 which is biased by means of a spring 72 to a position in the path of the hammer member 66 and which carries a roller 73 adapted to bear against the cam member 68. The cam member 68 is provided with a protuberance 74 adapted to engage the roller 73 and move the pawl 71 out of the path of the hammer 66. The pawl 71 is provided with a pin 76 which extends upwardly through a hole 77 formed in a shifter bar 78. The shifter bar 78 is connected to an upstanding arm 79 carried by the rocker shaft 49, so that when the push rod 39 is in its outer position and the latch 51 is riding on the shoulder 47, the pawl 71 is pulled out of the path of the hammer 66. The other end of the shifter bar 78 is mounted in a bracket 81 carried by the frame and is provided on its outer end with a shoulder 82 which engages with the bracket 81 when the latch 51 is shifted to ride on the shoulder 47 and holds the shifter bar 78 in its outer position.

The shifter bar 78 is also provided with a notch 83 adapted to be engaged by a pin 84 carried by the cam 68 when the platen carriage 14 is moved by hand from left to right to commence a new line of typing. When this action occurs, the pin 84 engaging the notch 83, moves the shifter bar 78 to the right (upwardly as seen in Fig. 2) to disengage the latch 51 and permit the push rod 39 to move outwards and interrupt the operation of the underscoring type bar. The shifter bar is biased toward the cam 68 by means of a light spring 85 to insure the pin 84 engaging with the notch 83 when the shifter bar 78 is in the position shown.

At 86 I show the usual ribbon elevator, and a bell crank lever 87 pivotally mounted at 88. The elevator 86 is provided at its lower end with a slot 89 through which the upper arm of the bell crank 87 projects. The outer arm of the bell crank lever lies immediately behind the roller 34 on the striker arm 33 when the striker arm is in operating position as shown in Fig. 2.

The operation of my improved apparatus as so far described is as follows:—Whenever it is desired to underscore words or sentences, the push rod 39 is pushed inwards until the latch 51 engages in the notch 46. In this position, the roller 34 of the striker bar 33 is in the path of the hammer 66. As the platen carriage 14 moves in response to operation of the regular type bar 12, the pinion 62 rotates, the hammer 66 being engaged by the pawl 71 and held against rotation, thereby compressing the spring 67. When the protuberance 74 of the cam 68 comes against the roller 73 of the pawl 71, the pawl is lifted out of the path of the hammer 66, releasing it and permitting it to strike the roller 34 of the striker bar 33.

This transmits motion to the underscoring type bar 27, causing it to strike against the platen 15. At the same time, the lower arm of the bell crank 87 is struck by the roller 34, causing the upper arm 87 to fly upwards and strike the ribbon elevator 86, moving it in the path of the underscoring character 28. The hammer 66 is so located that it strikes the roller 34 just as the platen carriage 14 is coming to rest after being moved in response to operation of the type bar 12. Thus, a character is typed by the type bar 12 and is immediately thereafter underscored by the underscoring type bar 27 and character 28.

When a line is typed, and the platen carriage 14 is moved by hand in the reverse direction against the force exerted by the spring 17, the pin 84 on the cam 68 engages in the notch 83 on the shifter bar 78 and moves the shifter bar over with the pawl 71, moving it out of the path of the hammer 66 and disengaging the latch 51 from the notch 46. The push rod 39 then moves outwards to interpose the shoulder 47 in the way of the latch 51. When the shifter bar 78 is thus moved, the shoulder 82 holds the shifter bar out of the path of the pin 84. When the push rod 39 moves outwards, it shifts the position of the bell crank 36 and the striker bar 33, moving the roller 34 out of the path of the hammer 66 so that the roller 34 is not struck by rotation of the hammer 66 nor is the movement of the hammer 66 alternately interrupted and released by the pawl 71. The action just described also occurs whenever the latch 51 is lifted manually out of the notch 46.

It will be understood that the terms "underscoring type bar" and "underscoring character" are used in their generic sense and that any suitable character may be employed which may be found desirable to repeatedly impress upon a page. It will also be obvious that repeated operation of the type bar is accomplished upon movement of the platen 14 to the left so that a continuous line of characters may be made when moving the carriage as by means of tabulator mechanism, not shown.

It will be seen, with the apparatus so far described, that the platen carriage spring 17 must be under sufficient tension at all times to effect the operation of the hammer 66. Where electric power is readily available, I may operate my underscoring type bar 27 by means of an electrical hammer as shown diagrammatically in Fig. 5. In accordance with this modification I mount on the lower end of the shaft 58, a commutator 91 having contact points 92 corresponding to the number of teeth in the pinion 57. Bearing against the commutator 91 is a brush 93 made of some non-conductive material, but having a contact strip 94 adapted to be brought into contact with the contacts 92 of the commutator 91. The brush 93 is pivotally mounted on a bar 96 through a triangular slot 97, so that, when the commutator 91 is rotating in the direction shown by the arrow, which is the direction it rotates upon movement of the platen carriage 14, in response to operation of the type bars 12, the contact strip 94 bears against the commutator 91. When the commutator 91 is rotating in the opposite direction, which is the direction it rotates when the platen carriage 14 is being moved to the right in opposition to the spring 17, the non-conducting part of the brush 93 bears against the commutator 91.

The contact strip 94 and commutator 91 are in an electric circuit 95 controlled by a switch 98 located at any suitable point. Included in the circuit 97 is a coil 99 having a core 101 which carries a hammer 102 positioned to strike the lower end of the underscoring type bar 27 when the circuit is completed. The core 101 is normally biased by means of a spring 103 to pull the hammer 102 away from the lower end of the underscoring type bar 27.

It will be noted in Fig. 5 that one of the contact points 92 has just passed the contact strip 94 on the brush 93. This is the position of rest of the platen carriage after the operation of one of the usual type bars 12. It will thus be seen that the underscoring type bar 27 is struck just as the platen 15 is coming to rest after a character has been typed by means of the usual type bars 12. When the platen 15 is moved to the right, the position of the brush 93 shifts so that the circuit 95 is not completed and the underscoring type bar 27 is not operated.

While I have shown my invention in but two forms, it will be obvious to those skilled in the art that it is not so limited but is susceptible of various other changes and modifications, without departing from the spirit thereof, and I desire therefore that only such limitations shall be placed thereupon as are imposed by the prior art, or as are specifically set forth in the appended claims.

What I claim is:

1. In a typewriter, type bars, a platen carriage movable in one direction upon operation of the type bars and manually movable in the opposite direction, a platen, a type bar guide in front of the platen, an underscoring type bar pivotally supported in front of the platen and having its striking end disposed in the type bar guide, the lower end of said underscoring type bar depending below the carriage, power actuated means operable in response to movement of the platen carriage upon operation of the type bars for striking the lower end of said underscoring type bar, and means for automatically disengaging the power actuated means upon a reverse movement of the carriage.

2. In a typewriter embodying type bars and a frame with a movable platen carriage and an escapement mechanism for limiting movements of the platen carriage in one direction controlled by the type bars, a platen on the carriage, a type bar guide positioned in front of the platen, an under carriage, a type bar bearing an underscoring character pivoted intermediate its ends to the under carriage and having its character bearing end positioned to one side in the type bar guide, and controllable means operable upon movement of the platen carriage in response to operation of the type bars to impart motion to the other end of the lever to cause the underscoring character to strike.

3. In a typewriter embodying a frame with a movable platen carriage and an escapement mechanism for limiting movements of the platen carriage in one direction controlled by the usual type bars; a platen on the carriage, a type bar guide positioned in front of the platen an under carriage, a type bar bearing an underscoring character pivoted intermediate its ends to the under carriage and having its character bearing end positioned to one side in the type bar guide, and controllable means operable upon movement of the platen carriage in response to operation of the type bars to impart motion to the other end of the underscoring type bar to cause the underscoring character to strike, said means being so disposed that the underscoring type bar strikes as the platen carriage is coming to rest after movement in response to operation of the usual type bars.

4. In a typewriter embodying a frame with a movable platen carriage and an escapement mechanism for limiting movement of the carriage in one direction controlled by the usual type bars; a platen on the carriage, a type bar guide positioned in front of the platen, an under carriage, a type bar bearing an underscoring character pivoted intermediate its ends to the under carriage and having its character bearing end positioned to one side in the type bar guide, controllable means operable upon movement of the platen carriage in response to operation of the type bars to impart motion to the other end of the underscoring type bar to cause the underscoring character to strike, and means for automatically disengaging the power actuated means upon a reverse movement of the carriage.

5. In a typewriter embodying a platen carriage with a platen and an escapement mechanism for the platen carriage operable by the usual type bars; a type bar guide positioned in front of the platen, an under carriage, a type bar bearing an underscoring character pivoted midway its ends to the under carriage and having its upper striking end positioned to one side in the type bar guide in advance of the striking point of the usual type bars, a striker bar operably connected to the lower end of the underscoring type bar, a hammer member for striking the striker bar, and controllable mechanism operable in response to movement of the platen carriage when operating the usual type bars to cause the hammer member to strike the striker bar.

6. In a typewriter embodying a platen carriage with a platen and an escapement mechanism for the platen carriage operable by the usual type bars; a type bar guide positioned in front of the platen, an under carriage, a type bar bearing an underscoring character pivoted midway its ends to the under carriage and having its upper striking end positioned to one side in the type bar guide in advance of the striking point of the usual type bars, a striker bar operably connected to the lower end of the underscoring type bar, a hammer member for striking the striker bar, controllable mechanism operable in response to movement of the platen carriage when operating the usual type bars to cause the hammer member to strike the striker bar, and means for selectively moving the striker bar out of the path of the hammer.

7. In a typewriter embodying a platen carriage with a platen and an escapement mechanism for the platen carriage operable by the usual type bars; a type bar guide positioned in front of the platen, an under carriage, a type bar bearing an underscoring character pivoted midway its ends to the under carriage and having its upper striking end positioned to one side in the type bar guide in advance of the striking point of the usual type bars, a striker bar operably connected to the lower end of the underscoring type bar, a rack on the platen carriage, a countershaft, a gear train from the rack to the countershaft, a hammer member for striking the striker bar journaled on the countershaft, a spring connecting the hammer member to the countershaft, a pawl adapted to be interposed in the path of the hammer member to hold it against rotation

and compress the spring, and a cam mounted on the countershaft for disengaging the pawl and releasing the hammer to strike the striker bar during each revolution of the countershaft.

8. In a typewriter embodying a platen carriage with a platen and an escapement mechanism for the carriage operable by the usual type bars; a type bar guide positioned in front of the platen, an undercarriage, a type bar bearing an underscoring character pivoted midway its ends to the undercarriage and having its upper striking end positioned to one side in the type bar guide in advance of the striking point of the usual type bars, a striker bar operably connected to the lower end of the underscoring key lever, a rack on the platen carriage, a countershaft, a gear train from the rack to the countershaft, a hammer member for striking the striker bar journaled on the countershaft, a spring connecting the hammer member to the countershaft, a pawl adapted to be interposed in the path of the hammer member to hold it against rotation and compress the spring, a cam mounted on the countershaft for disengaging the pawl and releasing the hammer to strike the striker bar during each revolution of the countershaft, means for selectively moving the striker bar in and out of the path of the hammer, and automatic means effective upon reverse movement of the platen carriage to move the striker bar out of the path of the hammer.

In testimony whereof, I, ROY H. MANLY, affix my signature.

ROY H. MANLY.