Aug. 7, 1945. H. M. ANDERSON 2,381,566

PRINTING TELEGRAPH APPARATUS

Filed May 5, 1944 3 Sheets-Sheet 1

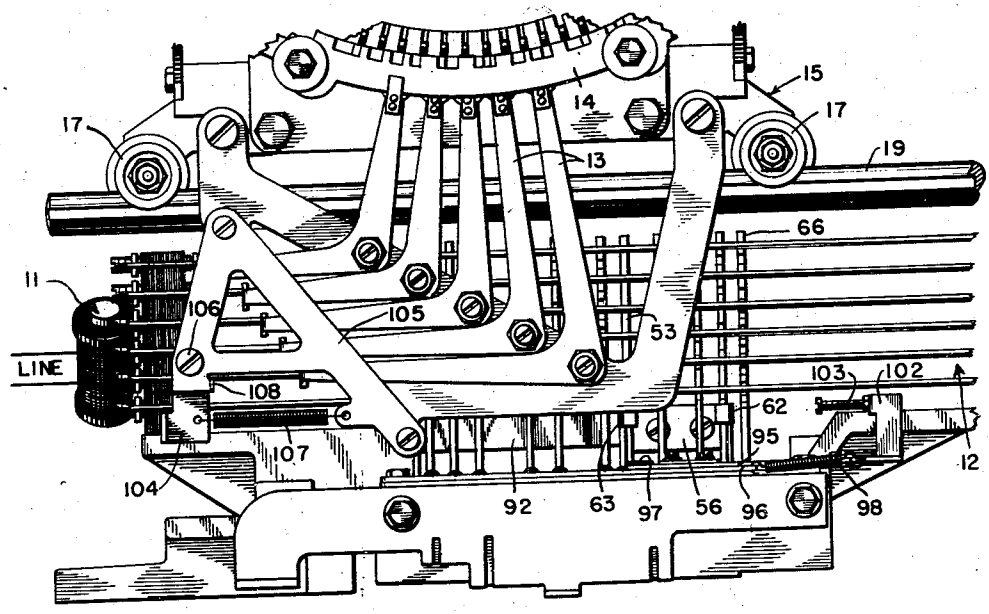


FIG. 2

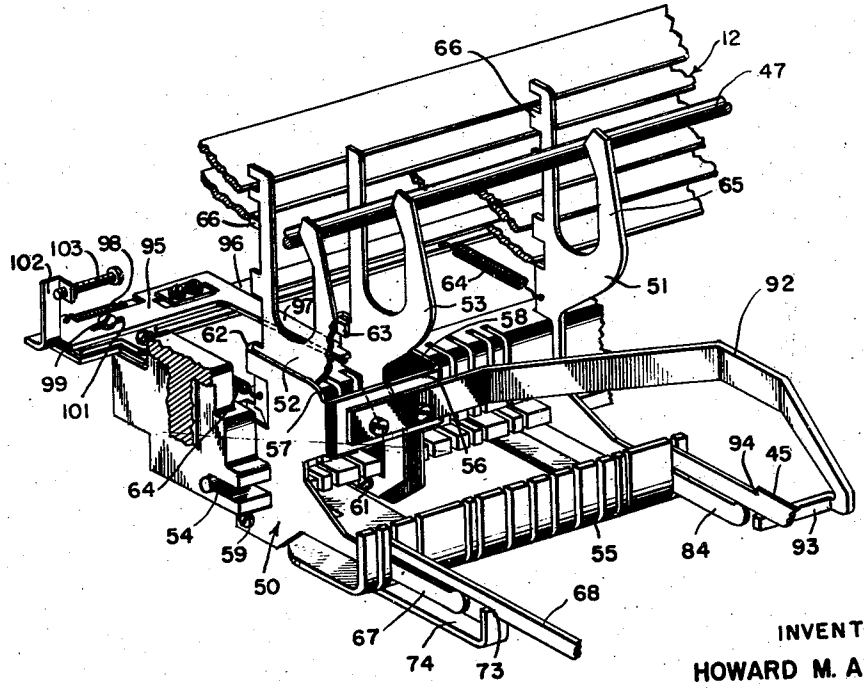


FIG. 1

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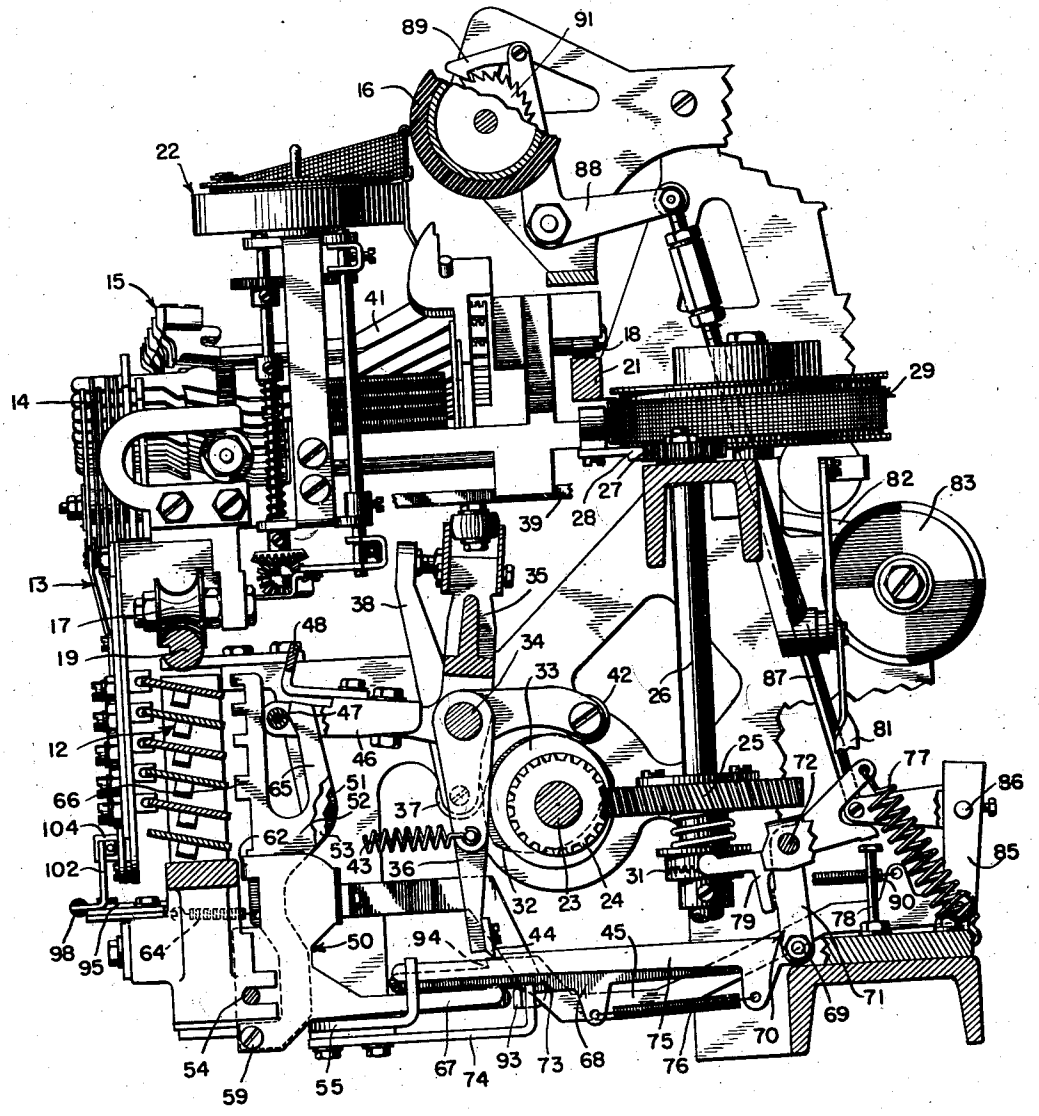


FIG. 3

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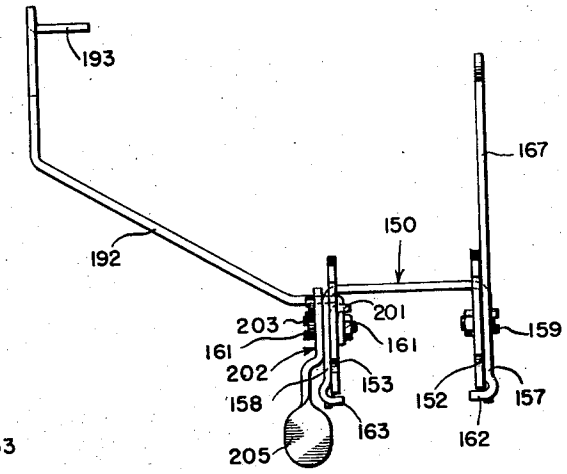


FIG. 4

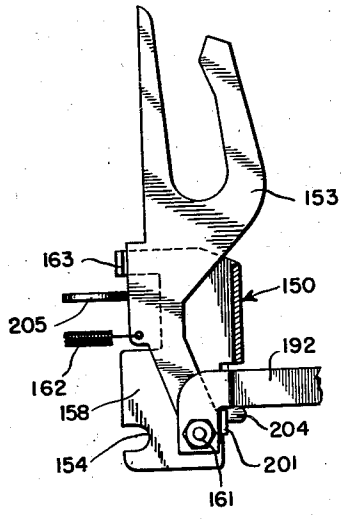


FIG. 7

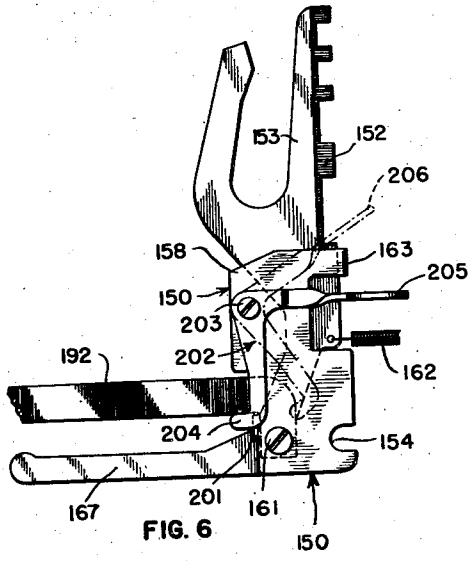


FIG. 6

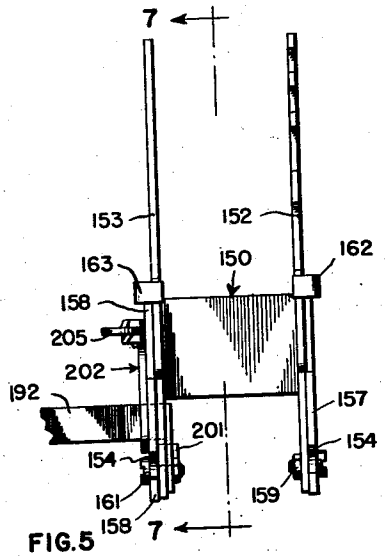


FIG. 5

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UNITED STATES PATENT OFFICE

2,381,566

PRINTING TELEGRAPH APPARATUS

Howard M. Anderson, West Lafayette, Ind., assignor to Teletype Corporation, Chicago, Ill., a corporation of Delaware

Application May 5, 1944, Serial No. 534,250

9 Claims. (Cl. 178—25)

The present invention pertains to printing telegraph apparatus and more particularly to improvements in function controlling mechanisms therefor.

The present invention contemplates the effectuation of the carriage return and line feed functions simultaneously in a printer of the type shown in U. S. Patent No. 1,904,164, issued to Morton et al. on April 18, 1933, by unblocking a normally blocked universal function lever, which in turn operates a bail to condition simultaneously the line feed push bar and the carriage return latch bar. In the embodiment of the device disclosed herein there is contemplated a function lever bail assembly comprising a special carriage return function lever and a universal function lever both pivotally mounted on a bail portion which in turn is pivotally mounted on the usual function lever pivot rod. The bail portion is provided with a pair of ears, one confronting each of the function levers carried thereon in such a manner that the selection of either function lever will effectuate the rotation of the bail portion about the function lever pivot rod independently of the operation of the other function lever. In this manner, the bail portion can be operated by either the carriage return function lever or the universal function lever.

The bail portion of the automatic line feed and carriage return assembly is also provided with two extensions, one for operating the line feed push bar and the other for operating the carriage return latch bar. The universal function lever, which is not coded, is normally blocked, and when it is unblocked, as will presently appear, it will cause the rotation of the bail portion independently of the operation of the carriage return function lever to effect through its pair of extensions the operations simultaneously of the line feed and carriage return mechanisms. The carriage return function lever is coded and is arranged to respond to a predetermined setting of the selector vanes, according to the above-mentioned U. S. Patent No. 1,904,164, and when so selected will cause the bail portion to be rocked independently of the operation of the universal function lever to effect the simultaneous performance of the line feed and carriage return functions. A blocking lever is mounted on the printer frame in front of the universal function lever and is spring biased into blocking relation with said function lever. A projection on the movable type carriage cooperates with the blocking lever so that when the carriage reaches a predetermined position in the line the blocking lever will be actuated to unblock the universal function lever to effectuate the line feed and carriage return operations simultaneously.

The primary object of the present invention is the provision of improved means for effecting automatically the simultaneous operations of the carriage return and line feed mechanisms upon the arrival of the printing instrumentalities at a predetermined point in a line of printing.

A more comprehensive understanding of the objects and features of the present invention may be had from the following description, taken in conjunction with the accompanying drawings, wherein;

Fig. 1 is a fragmental perspective rear view of the printing apparatus disclosed in U. S. Patent No. 1,904,164 showing the device according to the present invention embodied therein;

Fig. 2 is a partial front elevation of the printing apparatus embodying the present invention;

Fig. 3 is a sectional view of the printing apparatus illustrating the embodiment of the present invention therein; and

Figs. 4, 5, 6, and 7 are views of a modified form of the present invention.

Having reference to the drawings, and Figs. 2 and 3 in particular, the printer structure which has been chosen to illustrate the present invention, and which is fully described in the above-mentioned patent, comprises a typing unit (shown generally in section in Fig. 3) which includes a primary selecting mechanism indicated generally by the selector magnet 11 (Fig. 2) which is of the sword-and-T type disclosed in U .S. Patent No. 1,745,633 to S. Morton et al. (fully disclosed in the first mentioned patent), and a secondary selector or selector vane assembly indicated generally as 12. The selector vane assembly 12 controls through a series of bell cranks 13 (Fig. 2) a corresponding series of curved code bars 14 carried in a movable type carriage. As set forth in the first mentioned patent, this type carriage, indicated generally as 15, is movable longitudinally with respect to a stationary platen 16 (Fig. 3) by means of rollers 17 and 18 operating on rails or tracks 19 and 21, respectively. The type carriage 15 also carries a ribbon feed mechanism indicated generally as 22.

Referring particularly to Fig. 3, a motor (not shown) supplies power to a main operating shaft 23 which carries a spacing mechanism, exemplified herein by the spacing escapement worm gear 24 and a selector cam assembly (not shown) adapted to cooperate with the selector magnet 11, as described in the first mentioned patent. The spacing mechanism exemplified by gear 24 con-

trols through gear 25, shaft 26, gear 27, and rack 28 (Fig. 3) the movement of type carriage 15 to form character spaces, tending in this movement to wind up the carriage return spring mechanism indicated generally as 29. Upon receipt of the carriage return code signal, during normal operation of the printer, the carriage return mechanism 29 is permitted, due to the energy stored up in the carriage return spring, to return the carriage 15 to its normal or beginning of line position by declutching the grab clutch 31, as will presently appear. In accordance with the present invention, however, the return of the carriage 15 to its beginning of line position is accomplished independently of the reception of a carriage return code signal.

Mounted on the main operating shaft 23 and operatively connected thereto through the medium of a suitable clutch mechanism is an operating cam sleeve which carries a printing bail cam 32 and a function bail cam 33. Positioned parallel to the main operating shaft 23 is a shaft 34 on which are carried various mechanisms; for example, printing bail 35, function bail 36, and the escapement mechanism (not shown) which functions to control the step-by-step rotation of spacing worm gear 24. The printing bail cam 32 operates through follower roller 37 to rock a printing bail operating arm 38 (pivotally mounted on shaft 34) which actuates print bail 35 clockwise against the pull of a printing spring (not shown). In proper timed relation in the operative cycle, the energy stored up in the printing spring is released to actuate the printing bail 35 counterclockwise. This oscillatory movement imparted to the printing bail 35 functions to reciprocate a pull bar operating member 39 to cause the operation of a type bar 41, as clearly set forth in the first mentioned patent.

The function bail cam 33 operates through a follower roller 42 to rock the function bail 36 against the tension of a function bail spring 43 to actuate a function bail blade 44 to engage and operate any function push bar; for example, the line feed push bar 45, that may have been moved into its path by a selected function lever, as will hereinafter appear. The function bail 36 is provided with an extension 46 comprising a function lever bail rod 47 for controlling the selective operation of the function levers, and a portion 48 which acts upon selection of certain function levers to prevent movement of the function lever bail and to suppress printing and spacing, as is described in the first mentioned patent.

The selector vanes 12, as set forth in the aforementioned Patent No. 1,904,164, control the selection of a series of function levers among which are provided a line feed function lever 51, a carriage return function lever 52 and a universal function lever 53 (Figs. 1 and 3). The line feed function lever 51, like the function levers of the first mentioned patent, is pivoted on a common pivot rod 54 and is aligned in a slot in a function lever comb 55. However, according to the present invention, the function levers for controlling the carriage return and automatic carriage return and line feed functions are mounted on a function lever bail assembly indicated generally as 50 comprising a special carriage return function lever 52 and a universal function lever 53 pivotally mounted on the bail, which in turn is pivotally mounted on the usual function lever pivot rod 54. Bail 50 comprises a web portion 56 and two-side portions 57 and 58, which are each provided with an open ended slot for receiving the pivot rod 54 (Fig. 3). The carriage return function lever 52 is pivotally mounted at 59 to side portion 57, and universal function lever 53 is pivotally mounted at 61 to side portion 58. Confronting each of the levers 52 and 53 are ears 62 and 63 integral with side portions 57 and 58, respectively, of bail member 50. Each function lever has an individual spring 64, tending to rotate it counterclockwise about its respective pivot, as viewed in Figs. 1 and 3, but is restrained by the function lever bail 36 acting, through rod 47, and arms 65 of the respective function levers (Fig. 3). Function levers 51 and 52 are provided on their arms 66 with code notches and projections, characteristically arranged according to a code pattern, which cooperate with the vanes of the selector vane assembly 12. Function lever 51 is coded in accordance with the line feed code signal, and function lever 52 is coded according to the carriage return code signal. Function lever 53 is not coded and is called the universal function lever, since it is selected upon every operation of the function bail, except when it is blocked as will be hereinafter described.

The bail member 50 is provided with a rearwardly extending arm 67 which cooperates with a latch bar 68 pivoted at 69 to the depending arm 70 of a bell crank lever 71 which is pivotally mounted on a pivot shaft 72 appropriately located in the printer structure. Latch bar 68 is provided with a shoulder 73 which cooperates with a retainer bar 74 fastened to the under side of the comb 55. Also pivoted at 69 to the bell crank 71 is the carriage return push bar 75 which is provided near its forward end on its upper surface with a notch or shoulder adapted to operatively engage the function bail blade 44. A spring 76, having one end attached to the latch bar 68 and the other end attached to the push bar 75, normally tends to bias the bars in opposite directions about the pivot 69, such that latch bar 68 is normally biased to bring its shoulder 73 into operative relation with retainer 74, and push bar 75 is normally biased to bring its notch or shoulder into operative relation with the function bail blade 44.

The bell crank lever 71 is provided with an arm to the end of which is connected one end of a spring 77, the other end of the spring being attached to the base of the printer frame. Bell crank lever 71 is also provided with a laterally extending portion which cooperates with a stop 78 to limit the clockwise rotation of the bell crank lever 71, as will hereinafter appear. Also mounted on the pivot shaft 72 and cooperatively related to the bell crank lever 71 is a carriage return clutch-fork 79, the depending arm of which coacts with a lateral projection on the depending arm 70 of bell crank lever 71, such that when lever 71 rotates clockwise, similar movement will be imparted to the fork 79 to effect the disengagement of clutch 31 to effectuate the carriage return movement. The fork 79 is pivotally connected to a link 81 whereby said fork is retained during the carriage return interval in its clutch disengaging position until the type carriage 15 has been allowed to fully return to its beginning of line position, as more fully described in U. S. Patent No. 1,904,164.

Upon receipt of a carriage return code signal the selector mechanism will be responsive thereto and will set the vanes 12 correspondingly to effect the selection of the carriage return function lever 52 when the function bail 36 is operated. Spring 64 will tend to rotate function lever 52

about its pivot 59 to draw the arm 66 thereof into engagement with the vanes 12, and in so doing the function lever 52 will, through the confronting ear 62, rotate the bail member 50 about pivot rod 54 to raise the rearwardly extending arm 67 sufficiently to disengage shoulder 73 of the latch bar 68 from the retainer member 74. Due to this unlatching operation, spring 77 becomes effective to rotate bell crank 71 against stop 78 and to effect, through fork 79, the disengagement of clutch 31 to permit the carriage return spring 29 to return the type carriage 15 to its beginning of line position. At the same time, push bar 75 will be actuated leftwardly to bring the notch thereof into operative relation with bail blade 44 so that when the function bail 36 is rotated counterclockwise the push bar will be urged rightwardly, whereupon bell crank lever 71 is rotated in a counterclockwise direction against the pull of spring 77, and latch bar 68 is carried rightwardly to bring shoulder 73 again into latching engagement with retainer 74. As described in the above-mentioned Patent No. 1,904,164, the type carriage 15 upon returning to its beginning of line position will strike against a lever 82 associated with a dash pot 83 to absorb the blow, the lever 82 also acting to unlatch the link 81 to permit the fork 79 to cause the reengagement of clutch 31.

The line feed function lever 51 is provided with a rearwardly extending arm 84 (Fig. 1) which cooperates with the line feed push bar 45, which is pivotally carried on the end of the depending arm of a line feed bell crank lever 85 pivotally mounted on a shaft 86 suitably journaled in the printer frame. To the horizontal arm of bell crank lever 85 is pivotally connected one end of the line feed link 87, the other end of which is pivotally articulated to one arm of a line feed lever 88. To the other arm of lever 88 is pivoted a line feed pawl 89 which cooperates with a line feed ratchet 91 fixedly related to platen 16. Line feed push bar 45 is provided with a notch or shoulder portion on its upper forward surface which is adapted to be engaged by the function bail blade 44 when the line feed function is to be performed.

Upon receipt of a line feed code signal, the selector mechanism will respond thereto and will set the vanes 12 correspondingly to effect the selection of the line feed function lever 51 when the function bail 36 is operated. Function lever 51 will be actuated about its pivot 54 to raise the rearwardly extending arm 84 so as to lift the push bar 45 to bring the shoulder or notch thereon into the path of the function bail blade 44. When the function bail 36 is rotated counterclockwise, the push bar 45 will be urged rightwardly against the pull of its spring 90, to impart counterclockwise rotation to bell crank 85, whereupon link 87 will be actuated downwardly to impart clockwise rotation to lever 88 with the result that the line feed pawl 89 will rotate the ratchet 91 one angular step commensurate with a single line space of platen 16.

Referring to Fig. 1, it is to be observed that the universal function lever 53, like the carriage return function lever 52, is pivotally mounted on the bail member 50. Also, lever 53, when unblocked, tends under the influence of its individual spring 64 and through ear 63 to rotate the bail 50 counterclockwise about pivot rod 54. As a result of this rotation, arm 67 will be raised to effect the release of the carriage return latch bar 68 to initiate the operation of the carriage return mechanism. Secured to the web 56 of bail 50 is a specially shaped arm 92 which terminates in a reverted portion 93 adapted to underlie the line feed push bar 45, so that when bail 50 is rotated counterclockwise as described above, the portion 93 will lift the push bar 45 to bring the notch 94 into the path of the function bail blade 44 to initiate the operation of the line feed mechanism.

The blocking and unblocking of the universal function lever 53 is controlled by a slide member 95 which is slidably mounted upon a plate 96 positioned at the front of the typing unit and which is provided with an integral blocking arm 97. A spring 98 connected at one end to slide 95 and at the other end to the bracket or plate 96 tends to urge the member 95 rightwardly (as viewed in Fig. 1, and leftwardly as viewed in Fig. 2) against a pin or stop screw 99 cooperating with slot 101 in the slide 95. Slide 95 terminates in a vertically directed portion 102 which carries adjustably therein a screw element 103 which is adapted to cooperate with a striker member 104 (Fig. 2) pivotally carried on a member 105 mounted on the movable type carriage 15. Member 105 is comparable to bar 53 shown in Fig. 1 of Patent No. 1,904,164, employed for the purpose of retaining the bell crank selectors 13 in operable relation with the vanes of the vane frame 12. Thus, member 104, like member 105 and bell cranks 13, is movable with the type carriage 15 for character spacing. Member 104 is pivotally carried on pivot stud 106 on the member 105 and is normally biased in a counterclockwise direction (as viewed in Fig. 2) by a spring 107 against the stop 108. Member 104 is pivotally mounted to facilitate removal of the type carriage 15 from the typing unit. The spring 107 is stronger than the spring 98 so that as the carriage is moved in a step-by-step manner from the left (as viewed in Fig. 2) in response to the spacing operations the member 104 will strike the element 103 to move the slide 95 rightwardly to unblock the universal function lever 53. Thus, the spring 107 exercises dominion over spring 98 to effect automatic carriage return and line feed operations according to the present invention. If it is desired to remove the type carriage 15 from the typing unit, the element 104 is manually swung clockwise sufficiently to clear the element 103 and support 102.

General operation

In the operation of the device according to the present invention, the movable type carriage 15 is operated in a step-by-step manner, as is well known in the art. In prior devices, the movable carriage 15 was advanced to the end of the line, and in response to a selective code signal it was returned to its initial position at the beginning of the line. Under certain conditions of operation it was desired, simultaneously with the return of the carriage to its initial position, to rotate the platen 16 one step to effect line feed or line space. However, it sometimes occurred that the selective code signal was lost due to bad signaling conditions, in which case the carriage would not be returned to its initial position and the type characters would pile up at the end of the line. To preclude this occurrence, the automatic means according to the present invention is provided which does not depend upon selective code signals for its operation.

With the present invention, the element 104, during the character spacing movement of the type carriage 15, gradually approaches the ele-

ment 103. When a predetermined number of characters have been printed, or a predetermined number of spacing operations were effected, the element 104 strikes against the element 103, and through member 95, blocking element 97 is moved out of the path of the universal function lever 53, permitting the lever 53, which is not coded and hence does not require any particular setting of the vanes 12, to respond to the pull of its individual spring 64 and to rotate about its pivot 61 on bail 50. This rotation of lever 53 causes bail 50 to be rotated, lifting arm 92 and thus imparting or causing the end 93 thereof to lift the line feed push bar 45. Likewise, the rearwardly extending arm 67 of bail 50 will be raised. Thus, through the ends 67 and 93, the carriage return latch bar 68 and the line feed push bar 45, respectively, are operated simultaneously, thus initiating the carriage return and line feed operations automatically, as previously described.

Modification

In Figs. 4 to 7, inclusive, is illustrated a modification of the present invention which contemplates the disablement of the line feed operating portion of the bail 150, since it may sometimes be desirable to return the carriage to the initial position without affecting the operation of the line feed mechanism. Bail 150, like bail 50 of the principal embodiment, is provided with side members 157 and 158. Carriage return function lever 152 is pivotally mounted at 159 on side member 157 and universal function lever 153 is pivotally mounted at 161 on side member 158. Confronting each of the function levers 152 and 153 are ears 162 and 163, respectively, integral to the side members of the bail 150, and which serve the same purpose as ears 62 and 63 of the principal embodiment. The bail 150 is also provided with a rearwardly extending arm 167 comparable in purpose to arm 67 of the bail 50 of the main embodiment.

Instead of providing an arm, like arm 92 of the principal embodiment, affixed to the bail member 50, it is contemplated in the modification now being described to substitute for this arm an arm 192 which is pivotally connected to the bail 150 at pivot 161, which is also the pivot of the universal function lever. Arm 192 is also provided with a reverted portion 193 which cooperates with the line feed push bar (not shown). As clearly shown in Fig. 7, the universal function lever 153 is provided with a laterally directed portion 201 which is adapted to underlie the arm 192 so that whenever the universal bar 153 is allowed to operate the arm 192 will be invariably operated.

Having reference to Fig. 6, a bell crank lever 202 is shown pivoted at 203 to the side member 158. The depending arm of the bell crank lever 202 is provided with a laterally disposed extremity 204 adapted to underlie the arm 192. The horizontal arm of the bell crank lever 202 terminates in a finger piece 205 to render the bell crank lever 202 readily manipulable. The lever 202 is connected at pivot 203 to the member 158 through a friction washer so that the lever 202 will readily remain in any one of its actuated positions, for example, the position indicated in dotted lines as 206. With the bell crank 202 in its solid line position with the projection 204 underneath the arm 192, the bail assembly 150 operates in a manner similar to the bail 50 shown in Fig. 1 of the principal embodiment. However, if the arm 202 is swung to its dotted line position 206, then upon operation or selection of the carriage return function lever 152, the bail portion 150 will be rotated about notch 154 which engages a pivot rod similar to rod 54 of the principal embodiment, but in so doing the universal function lever 153 will not be actuated. Then neither the projection 201 nor the extremity 204 will have any effect upon the arm 192, which will not therefore be raised. However, still assuming that the bell crank 202 is being held in its dotted line position 206, and the universal function lever is unblocked so as to permit it to respond to the pull of its spring 162 to rotate, through ear 163, the bail member 150, the projection 201 will act to raise the arm 192 so that together with the operation of the arm 167 a simultaneous carriage return and line feed operation will be effected.

Although the invention has been described in connection with a specific form thereof it will be understood that it has further applications, and it is not intended to be limited in scope by the embodiment shown herein for illustration, but only by the scope of the appended claims.

What is claimed is:

1. In a recorder, a stationary framework, a type carriage movable to form character spaces, a permutation device supported by said stationary framework comprising a plurality of selector vanes, means to perform functions other than recording including a plurality of function code bars adapted to be controlled directly by said vanes, a carriage return means controlled by one of said code bars, a line feed mechanism controlled by another of said code bars, a universal code bar, means for initiating the operations of said carriage return means and said line feed mechanism simultaneously, said means carrying pivotally thereon the carriage return code bar and the universal code bar, and instrumentalities integral with said last recited means and confronting said carriage return code bar and said universal bar whereby the selection of either of said last mentioned code bars will effectuate the operation of said last recited means independently of the other.

2. In a recorder, a stationary framework, a type carriage movable to form character spaces, a permutation device supported by said stationary framework comprising a plurality of selector vanes, means to perform functions other than recording including a plurality of function code bars adapted to be controlled directly by said vanes, a carriage return means controlled by one of said code bars, a line feed mechanism controlled by another of said code bars, a universal code bar, single means for initiating the operations of said carriage return means and said line feed means simultaneously, said single means carrying pivotally thereon the carriage return code bar and said universal code bar, spring-biased blocking means normally restraining said universal code bar against selection, instrumentalities integral with said single means and confronting said pivotally carried code bars whereby the selection of either of said pivotally carried code bars will effectuate the rotation of said single means independently of the other, and means associated with said carriage and effective automatically when said carriage has reached a predetermined position to cause said blocking means to free said universal code bar for operation to initiate through said single means the simultaneous operation of said carriage return means and said line feed mechanism.

3. In a page printer including a movable type carriage and a platen, a permutation device com-

prising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, and means for supporting said elements, said means being dually controlled by said first and second elements to initiate the operation of said carriage return means and said line feed means simultaneously.

4. In a page printer including a type carriage and a platen, one movable with respect to the other, a permutation device comprising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, means dually controlled by said first and second elements to initiate the operation of said carriage return means and said line feed means simultaneously, and means to limit the control of said dually controlled means to said carriage return means.

5. In a page printer including a type carriage and a platen carriage, means for moving one carriage with respect to the other, a permutation device comprising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, means dually controlled by said first and second elements to initiate the operation of said carriage return means and said line feed means simultaneously, and means carried by said last recited means for determining the responsiveness of said line feed means to the control of said first element.

6. In a page printer including a type carriage and a platen carriage, means for moving one carriage with respect to the other, a permutation device comprising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, means for initiating the operations of said carriage return means and said line feed means simultaneously, said means carrying pivotally thereon said first and second elements, and instrumentalities integral with said last recited means and confronting said first and second elements, whereby the actuation of either of said elements will effectuate the operation of said last recited means independently of the other.

7. In a page printer including a type carriage and a platen carriage, means for moving one carriage with respect to the other, a permutation device comprising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, single means for initiating the operations of said carriage return means and said line feed means simultaneously, said single means carrying pivotally thereon said first and second elements, a restraining member normally confronting said second element to bar its actuation, instrumentalities integral with said single means and confronting said pivotally carried first and second elements, whereby the actuation of either said first or said second element will effectuate the operation of said single means independently of the other, and means associated with the movable carriage and effective automatically when said carriage has reached a predetermined position to cause said restraining member to free said second element for operation to initiate through said single means the simultaneous operation of said carriage return means and said line feed means.

8. In a page printer including a type carriage and a platen carriage, means for moving one carriage with respect to the other, carriage return means, line feed means, rockable means having arms for initiating the operations of said carriage return means and said line feed means simultaneously, and means to disable one of said arms to limit the control of said rockable means to said carriage return means.

9. In a page printer including a type carriage and a platen carriage, means for moving one carriage with respect to the other, a permutation device comprising a plurality of selector vanes, a first element selectively controlled by said vanes, a second element controlled independently of said vanes, carriage return means, line feed means, rockable means having arms for initiating the operations of said carriage return means and said line feed means simultaneously, said rockable means carrying pivotally thereon said first and second elements, instrumentalities integral with said rockable means and confronting said first and second elements, whereby the actuation of either of said elements will effectuate the operation of said rockable means independently of the other, and means to disable one of said arms to limit the control of said rockable means to said carriage return means.

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