

Nov. 3, 1953

B. F. MADSEN
SHIFT MECHANISM

2,658,105

Filed Dec. 21, 1951

2 Sheets-Sheet 1

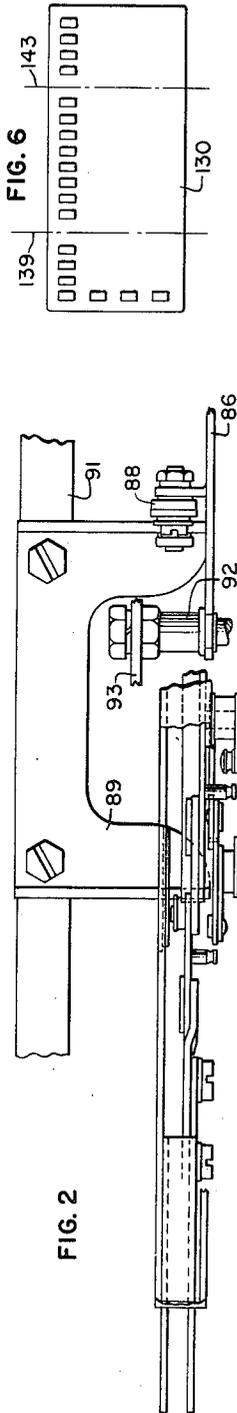


FIG. 2

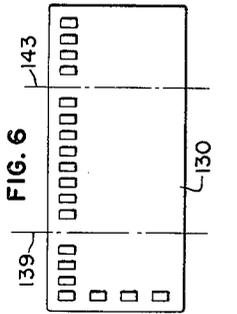


FIG. 6

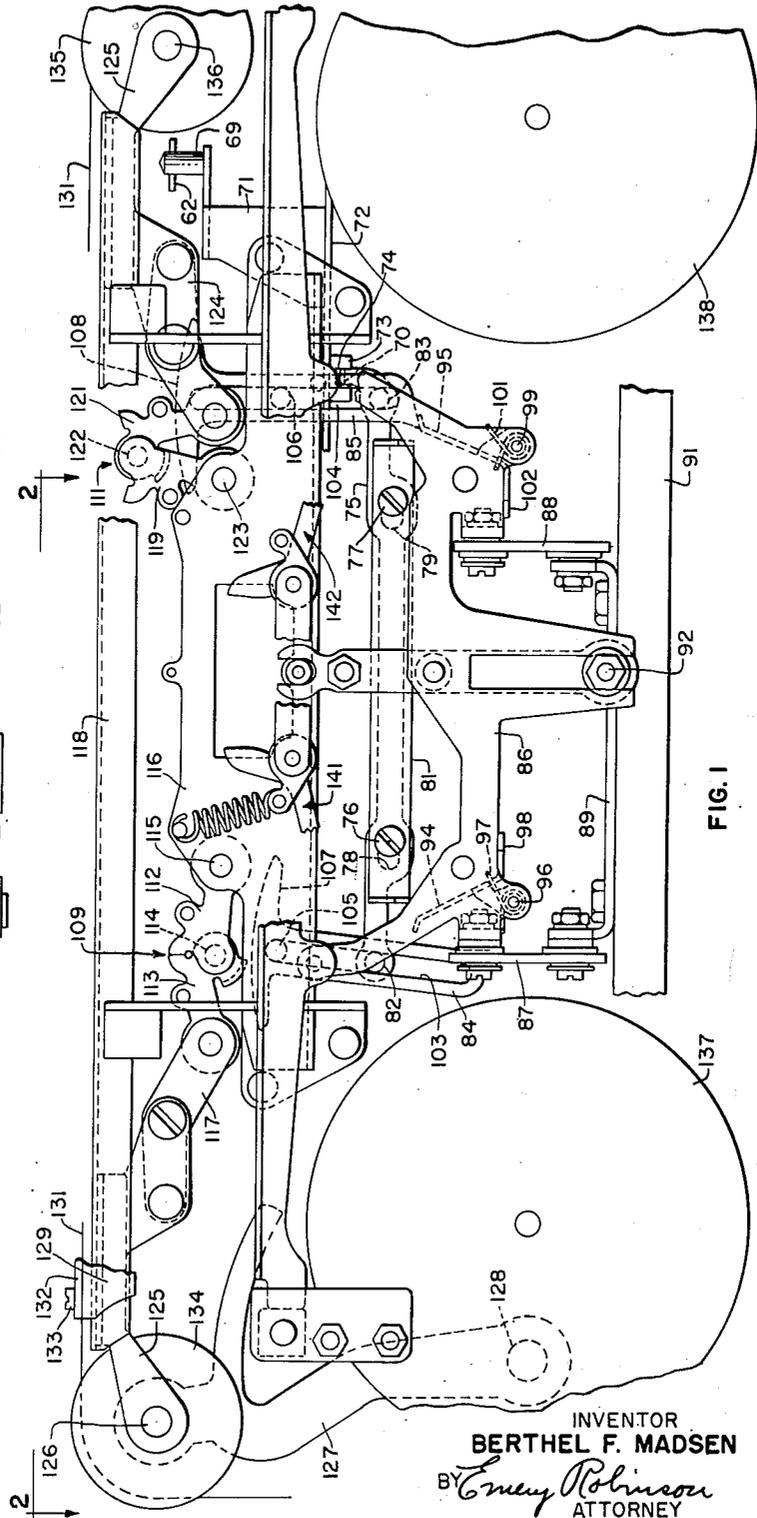


FIG. 1

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FIG. 5

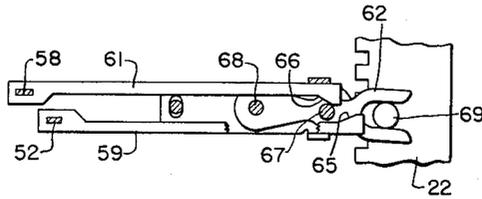


FIG. 4

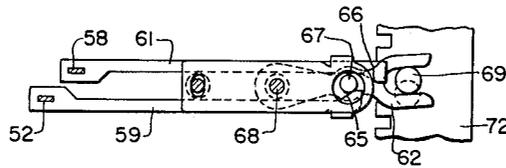
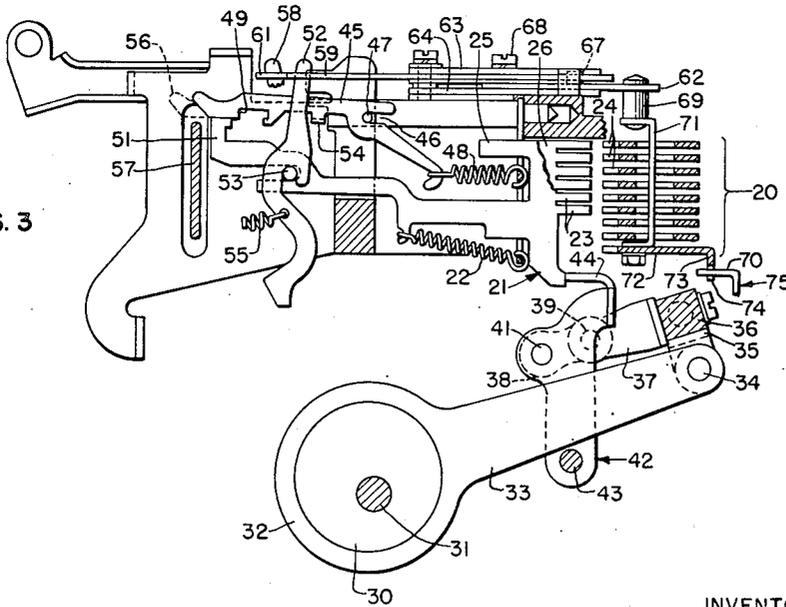


FIG. 3



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2,658,105

SHIFT MECHANISM

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6 Claims. (Cl. 178—25)

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The present invention relates to printing telegraph apparatus and more particularly to improvements in mechanism for controlling the effectuation of the shift and unshift functions.

The primary object of the invention is to provide a simple and efficient means for selectively effecting the positionment of a coordinately positionable type carrier in either upper or lower case position.

The printing telegraph apparatus to which the present invention is applicable is disclosed in U. S. Patent No. 2,505,729, issued April 25, 1950, to W. J. Zenner, and which is hereby incorporated herein by reference.

According to the disclosure in the aforesaid patent, the type carrier is divided horizontally into four sections, each having four vertical rows of characters. Identifying said sections from left to right as 1, 2, 3, and 4; sections 1 and 2 contain lower case or unshift characters, and sections 3 and 4 contain upper case or shift characters. Thus, the center line between sections 1 and 2 is indicative of the normal position of the type carrier in the unshift or lower case position, so that the type carrier is actuated rightwardly and leftwardly from this center line for the selection of lower case characters. Similarly, the center line between sections 3 and 4 is indicative of the normal position of the type carrier in the shift or upper case position, so that the type carrier is actuated rightwardly and leftwardly from this center line for the selection of upper case characters.

The characters are arranged on the type box or carrier for selection in response to the receipt of code signals in such a manner that characters represented by signals having a marking characteristic for a predetermined impulse (the third impulse) of the five unit code, are on sections 1 and 3 of the type carrier, and characters represented by signals having a spacing characteristic for the said predetermined impulse are on sections 2 and 4 of the type carrier. Signal responsive means is provided which upon the receipt of said predetermined impulse will bias the section to move in one direction or the other from either of said center lines depending upon the character of the predetermined impulse received. Thus, if the type carrier is in the unshift or lower case position whereat printing from sections 1 and 2 is effected, the reception of a marking characteristic for said predetermined impulse (which in the embodiment disclosed in the aforesaid patent is the third interval position of the five unit code) will cause printing to

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be effected from section 1, and conversely, the reception of a spacing characteristic for said predetermined impulse will cause printing to be effected from section 2. Moreover, if the type carrier is in the shift or upper case position whereat printing is effected from sections 3 and 4, the reception of a marking characteristic for said predetermined impulse will cause printing to be effected from section 3, and the reception of a spacing characteristic for said predetermined impulse will cause printing to be effected from section 4.

The apparatus described in said patent will, for a five unit code, provide thirty-two selections. However, since there are sixty-four possible selective positions on the type carrier, the type carrier may be moved the distance between one of the aforesaid center lines to the other by a case shifting and unshifting mechanism similar in ultimate effect to the case shifting mechanism of the usual form of printing telegraph apparatus. This case shifting mechanism comprises apparatus for shifting the entire type box or carrier from the position to print from sections 1 and 2 to the position to print from sections 3 and 4, or vice versa upon receipt of a shift or unshift signal.

A better understanding of the invention may be had by reference to the following description when considered in conjunction with the accompanying drawings, wherein:

Fig. 1 is a fragmental front elevational view of the telegraph printer, comparable to Fig. 6 of U. S. Patent No. 2,505,729, showing the type carrier shift mechanism according to the present invention;

Fig. 2 is a view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a transverse cross-sectional view of the selective control unit taken substantially at the position of the shift and unshift function levers;

Figs. 4 and 5 are fragmental plan views of the shift-unshift function slides in alternate operational position; and

Fig. 6 is a schematic view of the type carrier.

Having reference to Fig. 3, there is shown the basic function mechanism with which the "letters" (unshift) and "figures" (shift) mechanisms according to the present invention are associated. This basic function mechanism is located in the receiving page printers at all outlying stations. For a more thorough description of the printer with which the basic function mechanism shown in Fig. 3 is designed to be used, ref-

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erence should be had to the aforesaid U. S. Patent No. 2,505,729.

A set of code bars, indicated generally by the numeral 20, is suitably mounted in the printer, which code bars are comparable to code bars 62 to 70 of said Patent No. 2,505,729. Certain of said code bars 20 are movable longitudinally to one of two positions in accordance with the marking and spacing impulses of the well known Baudot code. Other of said code bars 20 are shifted longitudinally under predetermined operating conditions, as will hereinafter appear. A plurality of function bars 21 are suitably mounted in the apparatus with respect to the code bars 20, and are urged to the right (as viewed in Fig. 3) towards the code bars 20 by means of spring 22 individual to each function bar. Each function bar 21 has a plurality of code projections 23 which cooperate with code notches 24 in each of the code bars 20, in well known manner. As will presently appear, certain of the function bars, for example 25 and 26, are utilized to perform the shift and unshift functions.

A power shaft 31 carries thereon an eccentric cam 30 (Fig. 3). A collar 32 is mounted rotatably on the eccentric cam 30 and has an arm 33 by which cam 30 is connected pivotally by pivot 34 to a bracket 35 fixed to a rock shaft 36 appropriately journaled in the printer. Also fixed to the rock shaft 36, at substantially 90° from bracket 35, is an arm 37 which forms one element of a toggle, the other element of which comprises the link 38. Arm 37 and link 38 are pivotally connected through the pivot screw 39. The other end of link 38 is pivotally connected at 41 to a bail member 42 mounted pivotally on a shaft 43 suitably journaled in the printer. Bail member 42 is provided with a bail blade 44 adapted to cooperate with the function bars 21. As the shaft 31 rotates, the lever 32 is reciprocated, to thereby, through the toggle links 37-38, oscillate the bail 42.

A function pawl 45 has an elongated slot 46 by means of which the function pawl 45 is mounted for longitudinal movement on a shaft 47. A spring 48 continuously urges the function pawl 45 to the right (Fig. 3) and counterclockwise about the shaft 47. The function pawl 45 has a latching shoulder 49 which cooperates with a shoulder 51 on the function bar 21. Normally the latch 49 rides on the top of the shoulder 51 (as illustrated in Fig. 3) thereby permitting the spring 48 to retain the function pawl 45 in its rightward position. A function operating lever 52 is mounted pivotally on a shaft 53 and cooperates with a laterally directed portion 54 on the function pawl 45. The function operating lever 52 is biased in a clockwise direction by a spring 55.

Assuming that the permutation of positions of the code bars 20 has been set up which corresponds to the function bar 21, the bail 44 moves to the right and all of the projections 23 are opposite notches 24. The spring 22 is thereby permitted to move the function bar 21 to the right, the projections 23 entering the notches 24, and the shoulder 51 overriding the latching shoulder 49 to thereby engage said latching shoulder 49 due to the action of spring 48 upon the function pawl 45. Thereafter, as the bail 44 moves back to the left during its return stroke, it moves the function bar 21 also, and the function bar 21 in turn moves the function pawl 45 to the left. As the function pawl 45 moves to the left in this manner, the lateral projection 54 thereon engages and

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pivots the function operating lever 52 counterclockwise against the action of spring 55 to effect the function operations hereinafter described.

During the above-mentioned selective operation of function bar 21, the function pawl 45 was shifted from its solid line position to the dotted line position 56 over a vertically reciprocating bail member 57. Thereafter, as a new selection is being made in the code bars 20, the bail 57 moves upwardly to strip or disengage the function pawls 45 from latching engagement with their corresponding function bars 21. Stripper blade 57 is reciprocated vertically by suitable camming instrumentalities associated with the shaft 31.

Disposed above the "letters" function lever 52 and the "figures" function lever 58 are the "letters" function slide 59 and the "figures" function slide 61, which together with the "letters-figures" code bar fork 62 are suitably carried between mounting plates 63 and 64. As shown in Figs. 4 and 5, the function levers 52 and 58 are pivotally articulated at their upper ends to function slides 59 and 61, respectively. Slides 59 and 61 are provided at their right ends (as viewed in Figs. 4 and 5) with confronting cam surfaces 65 and 66, respectively, which are adapted to cooperate with a stud 67 carried on the fork 62. Fork 62 is pivotally mounted on a pivot shaft 68 journaled in the mounting plates 63 and 64.

The forked end of the code bar fork 62 cooperates pivotally with a stud 69 secured to a bracket 71 fixedly mounted on the "letters-figures" shift code bar 72, which is one member of the group of code bars 20. Code bar 72 is provided with a depending portion 73 having a notch 74 by means of which the bar 72 is articulated, through portion 70, to a "letters-figures" shift slide 75 (code bar 72 is comparable to code bar 400, and slide 75 is comparable to slide 408, shown in Figs. 6 and 7 of said Patent No. 2,505,729). Slide 75 is slidably carried for reciprocative movement, under the control of code bar 72, by a pair of studs 76 and 77 (Fig. 1) cooperating with slots 78 and 79 in said slide 75. Stud 76 and 77 are carried in fixed frame member 81.

Upon receipt of a "letters" or unshift code signal, the code bars 20 will be set permutatively to permit the selection of the "letters" shift function bar 25 to effect the operation of pawl 45 and the rotation of lever 52. Through its pivotal articulation with slide 59, lever 52 will actuate said slide 59 leftwardly, as viewed in Fig. 4, to cause its camming surface 65 to coast with stud 67 to swing the fork 62 counterclockwise to the position shown in Fig. 4. Code bar 72 will thus be actuated rightwardly, as viewed in Fig. 1, to move the shift slide 75 rightwardly to the position opposite to that indicated in Fig. 1. On the other hand, when the "figures" shift code signal is received, the code bars 20 will be set accordingly to permit the selection of the "figures" shift function bar 26 to effect through its associated pawl, the rotation of lever 58. Through the pivotal connection with slide 61, lever 58 will actuate said slide 61 leftwardly (it being understood that normally the slides 59 and 61 assume their rightward position, except when cyclically operated during the shift and unshift function cycles), to cause the camming surface 66 of said slide 61 to coast with stud 67 to swing the fork 62 clockwise to the position shown in Fig. 5. Code bar 72 will therefore be moved leftwardly to actuate, through the interconnection 70-74, the shift slide 75 leftwardly, as viewed in Fig. 1, to the position shown in Fig. 1. Carried fixedly substan-

tially at the extremities of the shift slide 75 are a pair of studs 82 and 83 which are adapted to cooperate with a pair of shift link breaker slides or interponents 84 and 85, respectively, as will presently appear.

Cooperating with the breaker slides 84 and 85, in a manner to be described, is a main bail member 86 which is adapted to be reciprocated vertically. To effect this reciprocation, main bail 86 is connected pivotally to the upper ends of a pair of links 87 and 88, the lower ends of said links 87 and 88 being connected pivotally to a main bail drive bracket 89 secured to a main bail drive shaft 91. Shaft 91 is comparable to shaft 178 of the aforesaid Patent No. 2,505,729 (shown in Figs. 5, 13 and 18 of the patent). A rocking motion is imparted to shaft 91 in the manner shown and described in said Patent 2,505,729, which rocking motion is translated, through bracket 89 and links 87 and 88, into vertically reciprocative motion in the bail 86. Bail 86 is guided by a stud 92 secured to the main frame 93 (Fig. 2).

Carried at each side of the bail 86 in cooperative relation with the breaker slides 84 and 85 are breaker slide bails 94 and 95, respectively. Bail 94 is pivotally mounted on a pivot 96 carried in the main bail 86, and is yieldable in a clockwise direction through the instrumentality of a spring 97, counterclockwise movement of bail 94 being limited by stop portion 98. Also, bail 95 is pivotally mounted on a pivot 99 carried in the main bail 86 and is yieldable in a counterclockwise direction through the instrumentality of a spring 101, clockwise movement of bail 95 being limited by stop portion 102.

The breaker slides 84 and 85 are provided with slots 103 and 104, respectively. Slot 103 is engageable with a fixed pivot stud 105 and the movable stud 82, so that as the slide 75 is shifted rightwardly or leftwardly the slide 84 is swung about the fixed pivot 105. Similarly, the slot 104 is engageable with a fixed pivot 106 and the movable stud 83, so that as the slide 75 is shifted, the slide 85 is swung about the fixed pivot 106. The breaker slides 84 and 85 are formed at their upper ends with arcuately shaped surfaces 107 and 108, respectively, adapted to cooperate with a pair of toggles or knee action devices 109 and 111, respectively. The surfaces 107 and 108 are of sufficient length to compensate for the shifting movement of toggles 109 and 111.

When the bail 86 is in its lowermost position (substantially opposite to that shown in Fig. 1), the links 94 and 95 clear the lower ends of the slides 84 and 85 so that when a change of case (from shift to unshift or vice versa) occurs, the respective slides 84 and 85 may be swung from their inoperative to the operative positions. In Fig. 1, the slide 85 is shown in its operative position, and slide 84 is shown in its inoperative position. Now, upon a change of case (from "figures" to "letters" in the illustration shown in Fig. 1, since the shift slide 75 is shown in its "figures" position), the slide 75 will be shifted rightwardly to swing slide 84 into its vertical position, and to rotate slide 85 clockwise to swing the lower end thereof clear of the bail 95. Then, when the main bail 86 is again moved upwardly, the left breaker slide bail 94 strikes against the bottom edge of slide 84 to actuate said slide 84 vertically so that the bearing edge 107 functions to break or collapse the toggle or knee action connection 109, the result of which is to straighten out the knee action connection 111. Conversely again, when a "figures" shift signal is received,

the shift slide 75 is shifted back to the position shown in Fig. 1, whereat slide 85 is positioned above the breaker slide bail 95 to coact therewith (and the slide 84 is swung clear of bail 94), so that when the main bail 86 is again operated upwardly, the bearing surface 108 will act to collapse the toggle 111, and the toggle 109 will again assume its substantially straight position.

Toggle device 109 comprises links or elements 112 and 113 connected by a common pivot 114. The other end of link 112 is connected by pivot 115 to a plate 116, comparable to plate 264 shown in Fig. 2 of said Patent No. 2,505,729. The other end of link 113 is connected to a bracket 117 fixed to a channel member 118, comparable to channel member 332 shown in Figs. 2 and 6 of said Patent No. 2,505,729. Similarly, the toggle device 111 comprises links 119 and 121 connected by a common pivot 122. The other end of link 119 is connected by pivot 123 to the plate 116, and the other end of link 121 is connected to a bracket 124 fixed to the channel member 118. The channel member 118, through extensions 125 of its flanges is supported pivotally on pivot shaft 126 carried by members 127 pivotally mounted at 128 to suitable brackets carried in the printer. Only one support 127 is illustrated.

Astride the inverted channel member 118 is a saddle member 129 (comparable to saddle member 336 in said Patent No. 2,505,729) for controlling the movement of the type carrier 130 (comparable to type carrier 99 in said patent). The type carrier 130 is exemplified by Fig. 6. A strap or cable 131 is clamped between the top of the saddle member 129 and a suitable clamping member 132 is secured by screws 133. The strap or cable 131 extends around rollers 134 and 135, pivotally mounted pivots 126 and 136, respectively, and then around the carriage return drum 137 and spacing drum 138, in the manner described and shown in said patent.

As indicated hereinbefore, the type carrier 130 is divided horizontally into four sections, each section embracing four vertical rows of characters. Identifying said sections from left to right as 1, 2, 3, and 4; sections 1 and 2 contain lower case or unshift ("letters") characters, and sections 3 and 4 contain upper case or shift ("figures") characters. Thus, the center line 139 (Fig. 6) between sections 1 and 2 is indicative of the normal position of the type carrier in the unshift or lower case position, so that the type carrier 130 is actuated rightwardly and leftwardly from this center line by means of the knee-action arrangements exemplified by elements 141 and 142, comparable to the knee-action arrangements exemplified by elements 274 and 275 shown and described in said Patent No. 2,505,729, to effect the selection of lower case characters to the right or left of said center line 139.

The center line 143 between sections 3 and 4 is indicative of the normal position of the type carrier in the shift or upper case position, so that the type carrier is actuated rightwardly and leftwardly from this center line by means of said knee-action arrangements, exemplified by the anticipator links 141 and 142. As fully set forth in said Patent No. 2,505,729, rightward and leftward motion is imparted to rail 118 under the control from two sources; namely, from the bar 116 under the control of knee-action arrangements 141 and 142, and secondly from the shift and unshift knee-action or toggle arrangements 109 and 111.

It is to be understood that the above-de-

scribed arrangement is merely illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, permutation means responsive to received code combinations of selecting conditions for selecting a character element in each of said groups, toggle shift means for case shifting said carriage, one toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, one associated with each toggle shift means, and means controlled by said permutation means for positioning said interponents into the path of said common actuating means to render said common actuating means effective to actuate said toggle shift means selectively, whereby selection of character elements from either of said groups is facilitated.

2. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, toggle shift means for case shifting said carriage, one toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, one associated with each toggle shift means, and means for positioning said interponents into the path of said common actuating means to render said common actuating means effective to actuate said toggle shift means selectively, whereby selection of character elements from either of said groups is facilitated.

3. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, permutation means responsive to received code combinations of selecting conditions for selecting a character element in each of said groups, toggle shift means for case shifting said carriage, one toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, one associated with each toggle shift means, a special code bar, swingable means operably associated with said special code bar, a pair of alternately operable means controlled by said permutation means, said pair of alternately operable means having confronting cam means cooperable with said swingable means, and means operated by said special code bar under the control of said cam means for positioning said interponents to render said common actuating means effective to actuate said toggle shift means selectively, whereby selection of character elements from either of said groups is effectuated.

4. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, permutation

means responsive to received code combinations of selecting conditions for selecting a character element in each of said groups, toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, one associated with each toggle shift means, a shift control means controlled by said permutation means, said shift control means comprising a pair of alternately operable cam means and a swingable member operated thereby for positioning said interponents to render said common actuating means effective to actuate said toggle shift means selectively, whereby selection of character elements from either of said groups is effectuated.

5. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, permutation means responsive to received code combinations of selecting conditions for selecting a character element in each of said groups, toggle shift means for case shifting said carriage, one toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, a slidably shiftable link cooperably related to said interponents, a special code bar operably connected to said link, swingable means operably associated with said special code bar, and a pair of alternately operable means controlled by said permutation means, said pair of alternately operable means having confronting cam means cooperable with said swingable means, whereby said special code bar is actuated to control the positionment of said interponents to render said common actuating means effective to activate said toggle shift means selectively to effect the selection of character elements from either of said groups.

6. In a recorder, a type carriage comprising a plurality of character elements arranged in lower case and upper case groups, permutation means responsive to received code combinations of selecting conditions for selecting a character element in each of said groups, toggle shift means for case shifting said carriage, one toggle shift means associated with each of said groups, common actuating means for both of said toggle shift means, a pair of interponents, one associated with each toggle shift means, a special code bar, means controlled by said code bar for positioning said interponents into the path of said common actuating means to render said common actuating means effective to actuate said toggle shift means selectively, whereby selection of character elements from either of said groups is facilitated.

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