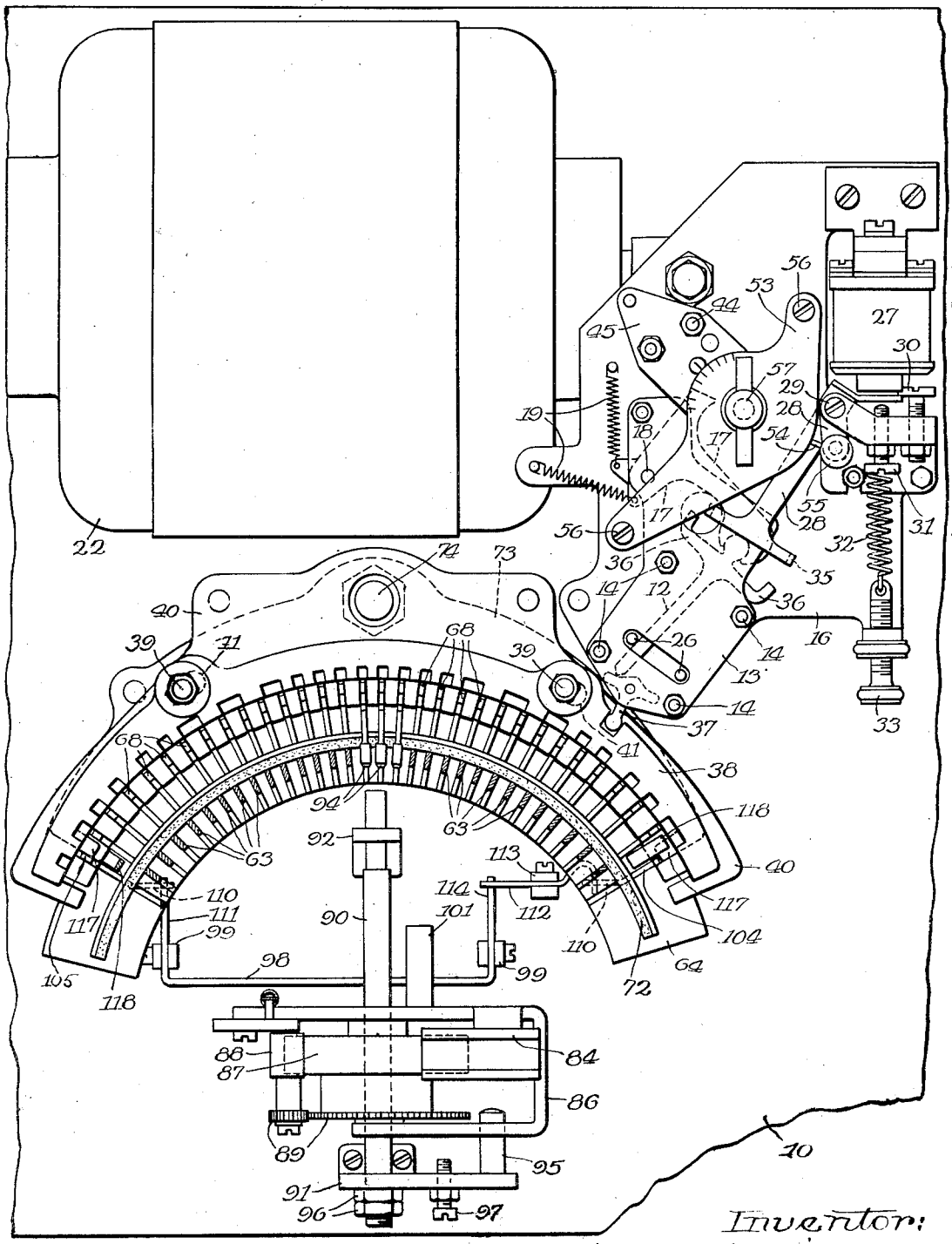
March 17, 1931. H. L. KRUM 1,796,378

TELEGRAPH PRINTER

Original Filed April 9, 1927 3 Sheets-Sheet 1

Fig. 1



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TELEGRAPH PRINTER

Original Filed April 9, 1927 3 Sheets-Sheet 2

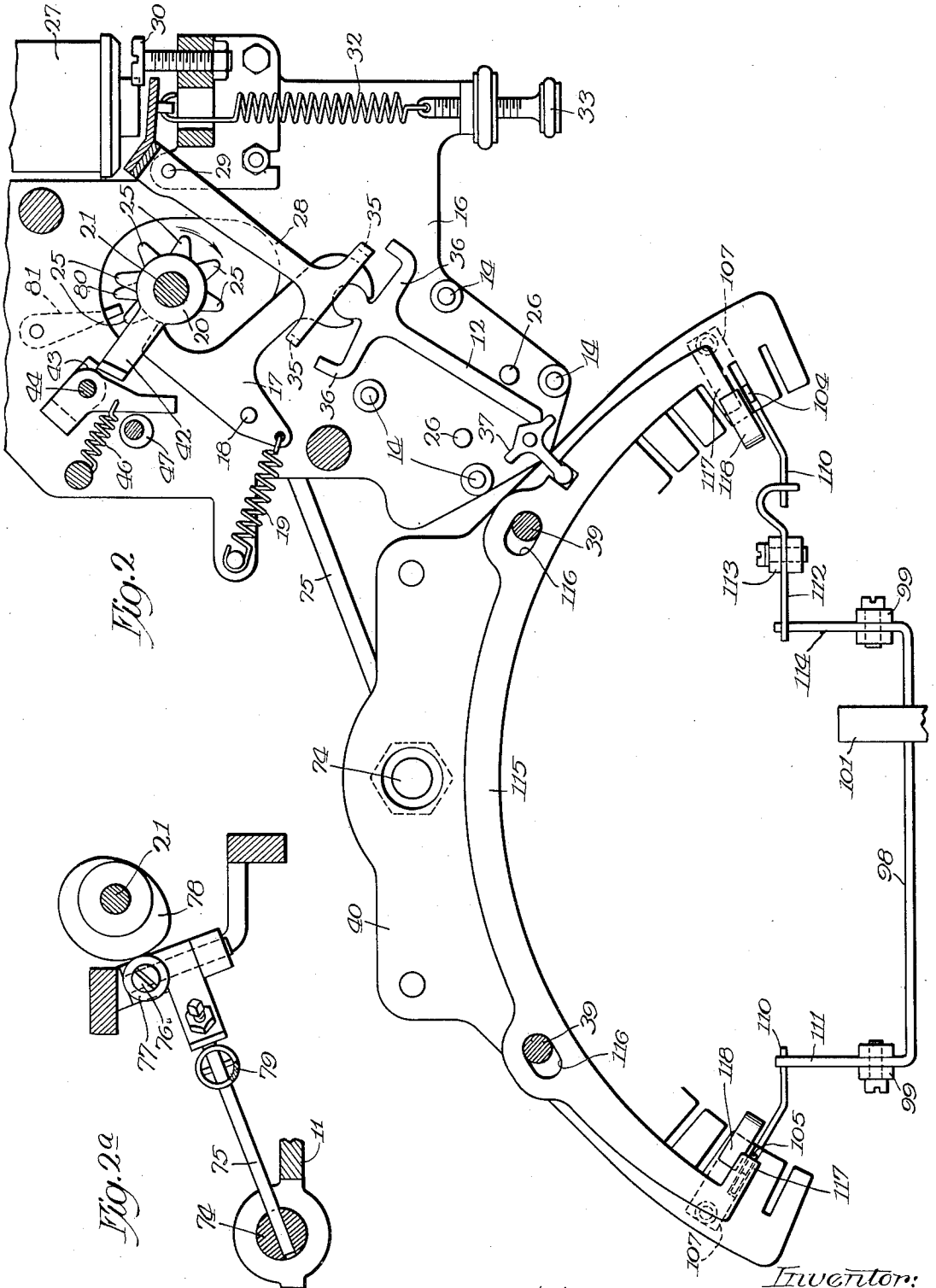


Fig. 2

Fig. 2a

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TELEGRAPH PRINTER

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Fig.4

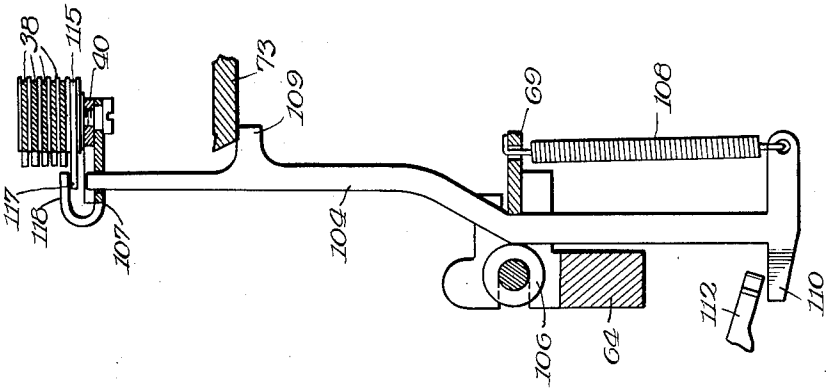


Fig.3

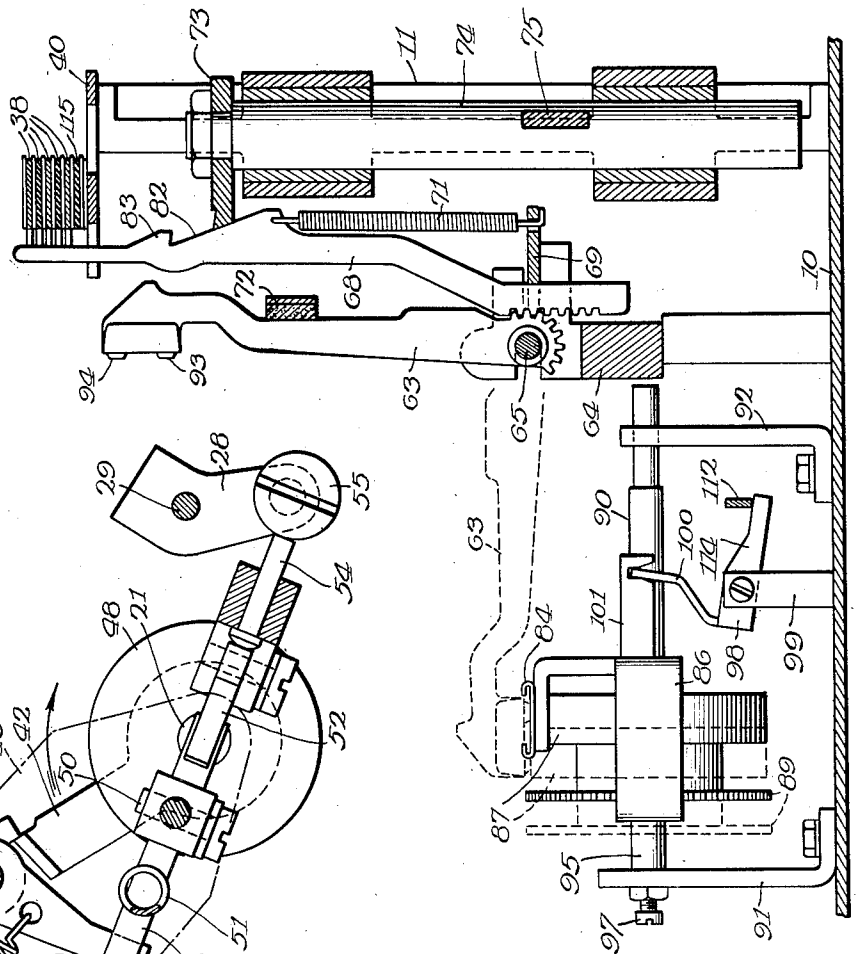


Fig.5

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UNITED STATES PATENT OFFICE

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TELEGRAPH PRINTER

Application filed April 9, 1927, Serial No. 182,327. Renewed October 17, 1929.

The invention relates to telegraph printers which are operative in response to the Baudot code, i. e., one in which the characters are selected by permutations of two different electrical conditions, such as positive and negative impulses, or current and no current impulses extending through a definite number of time intervals or units. Usually in such printers there are five selecting intervals in each code combination, and a corresponding number of permutation members are positioned in different combinations in response to the selecting intervals of the code combinations to control the operation of the printer. Such printers usually employ "case shift" mechanism to effect the printing either of letters or figures. With a five interval code, the shift mechanism is controlled by the permutation members in response to two special code combinations or signals.

In certain classes of telegraph work, such, for example, as recording stock quotations, the changes from one class of character to the other occur very frequently, and hence the special shift signals take up a considerable part of the time required for transmitting the material. To save time and increase the speed of transmission in telegraph systems adapted for such special work, the present improved printer is adapted to respond to code combinations consisting of six selecting intervals, five permutation members or bars being provided and adapted to respond to five of the selecting intervals to thereby select the characters to be printed, and the additional selecting interval of each code combination being arranged to control an additional selecting or controlling member which determines the operation of the case shift mechanism.

The invention also provides operating mechanism which is arranged to first operate the case shift mechanism in accordance with the setting of the shift control member and then effect the printing of the type selected by the five permutation members.

The invention also consists in the features of improvement hereinafter set forth, illustrated in preferred form in the accompanying drawings, and the invention is more particularly defined in the appended claims.

In the drawings:

Fig. 1 is a plan view of the improved telegraph printer.

Fig. 2 is a plan view on an enlarged scale illustrating the shift mechanism.

Fig. 2*a* is a detail section illustrating the striker bar actuating mechanism.

Figs. 3 and 4 are vertical sections on the lines 3—3 and 4—4 respectively of Figs. 1 and 2.

Fig. 5 is a detail horizontal section illustrating the trip mechanism.

Except for the manner of selecting and effecting the operation of the shift mechanism, the apparatus shown is similar to that set forth in a prior application filed in the United States Patent Office December 23, 1924, by Sterling Morton and myself, Serial No. 757,661. The selecting mechanism of this apparatus comprises a series of primary selectors or fingers 12 arranged in superposed relation between spaced guide plates 13, these plates being mounted on studs 14 rising from a horizontal plate 16, the latter being supported in elevated position by a suitable bracket rising from the base plate 10. The circular rear ends of the fingers 12 pivotally engage corresponding seats in a series of bell crank levers 17 which are arranged between the guide plates 13 and pivoted on a stud 18. The other arms of the bell cranks are provided with pointed ends and springs 19 hold the bell cranks and fingers in normal position with the pointed ends of the former adjacent the periphery of a cam member 20. The latter is mounted upon the upper end of a shaft 21 driven by a motor 22, and, as it is rotated, a spirally disposed series of teeth 25 on the cam are arranged to successively oscillate the levers and reciprocate the selecting fingers 12.

In addition to their reciprocating movements, the selecting fingers 12 swing laterally about their pivotal connections with the levers 17. The pivotal movements of the fingers are limited by pins 26 projecting upwardly from the plate 16 and are controlled by the armature of an electro-magnet 27.

The magnet armature is fixed to a lever 28 pivoted at 29 and limited in its vibratory movement by a pair of adjustable stop screws 30 and 31. A spring 32 connected to the armature lever and to an adjustable thumb screw 33 tends to hold the armature lever in engagement with the stop screw 31. The free T-shaped end of the armature lever is provided with a pair of spaced depending lugs 35 which co-operate with pairs of laterally projecting arms 36 on the selecting fingers. The latter are provided with offset ends extending toward the lugs 35 and the latter are so spaced that they will align with the contacting end of one or the other of the arms 36 on each finger, according as the controlling magnet 27 is energized or de-energized. In this way, the fingers 12 are positioned either in their right hand or left hand position as they are reciprocated. The latter act through a series of T-levers 37 to position a set of longitudinally movable, notched permutation bars 38. The latter are segmental in form and are mounted on studs 39 which project upwardly from a fixed segmental plate 40 and extend through short slots 41 in the permutation bars to permit the longitudinal movement of each bar to either one of two positions. The springs 19 normally hold the selecting fingers 12 in their forward positions in engagement with the T-levers 37, and the permutation bars 38 are thereby held in one or the other of their two positions, according as the corresponding selecting finger is in its right or left hand position.

The notched permutation bars are five in number and correspond to five of the selecting intervals or units of the code combinations or signals and which, as stated, comprise permutations of two different electrical conditions extending through a definite number of time intervals or units. As each signal is received, the magnet 27 responds to two different electrical conditions of the signals and selectively vibrates the armature lever 28. Also, as each signal is received, the selecting fingers 12 corresponding to the five permutation bars are successively retracted by the rotation of the cam member 20, and are thereby brought into cooperative relation with the armature during the mid-portions of the corresponding selecting intervals of the signals. In case the signal requires a change in the position of any one of the permutation bars, one of the arms 36 of the corresponding finger will contact with one of the lugs or abutments 35 of the armature lever, and the finger is thereby swung laterally either from its right to its left hand position or vice versa. Then, during the final forward movement of the finger effected by the spring 19, it will, through the medium of the associated T-lever 37, change the position of the corresponding permutation bar. But if the latter is locked by the printing of a perviously selected character, the change in the position of the permutation bar is delayed until such printing operation is completed and the permutation bar released. If no change is required in the setting of any one of the five notched permutation bars, the armature lever will be in such position that the corresponding selecting finger will not contact therewith as such finger is retracted. It is noted that the primary selectors or fingers 12, and the secondary selectors or notched permutation bars 38 retain their setting until the same is changed in response to a received signal.

To synchronize the operation of the cam 20 with the intervals of each received signal, the latter, in the construction shown, is connected to the shaft 21 by a slip friction clutch mechanism and the cam is initiated and arrested in operation under control of the magnet 27 and in response to starting and spacing intervals at the beginning and end of each signal. The start-stop mechanism shown is similar to that set forth in a prior application filed by me July 16, 1926, Serial No. 122,808, and comprises a stop arm 42 fixed to the cam member and normally engaged by a dog 43 (see Fig. 5) that is pivotally mounted at 44 on the underside of a plate 45. A spring 46 connected to the dog tends to hold it in engagement with an adjustable eccentric stop 47, but a slip friction clutch 48, by which the cam is connected to the shaft 21, normally tends to rotate the cam and the stop arm 42 in right hand direction, so that the pressure of the stop arm on the dog tends to rotate the latter in left hand direction. Such movement of the dog is normally prevented by a latch 49 horizontally pivoted at 50 to a lug on the underside of the plate 45 and which is normally held by a light spring 51 in engagement with the tail end of the dog 43. A bell-crank lever 52 horizontally pivoted on a lug on the underside of a plate 53 (see Fig. 1) engages the latch 49 at a point in line with the axis of the shaft 21 and this bell-crank is adapted to be shifted by a plunger 54 to trip the latch and release the stop dog and operating cam. The plunger 54 is engaged and operated by an adjustable eccentric abutment 55 on the armature lever. In this way, as more fully set forth in the application above noted, Serial No. 122,808, the cam 20 is initiated in operation in response to a starting unit or interval which precedes the selecting intervals of each signal.

The plate 53 is arranged above the upper end of the shaft 21 and is carried on posts 53′ which rise from the plate 16. The plate 45 which carries the stop dog 43 and latch 49 engages the underside of the plate 53 and is connected thereto by a clamp screw 45′ which is in alignment with the shaft 21. With this

arrangement, the stop dog is rotatably adjustable about the axis of the cam 20, as set forth in the above noted application, Serial No. 122,808, to insure the passing of the cam through its selector operating positions during the midportions of the selecting intervals of the signals.

The five notched permutation bars control a set of type bars 63 which are connected to a supporting segment 64 by a pivot rod 65. The segment is mounted on posts rising from the base plate 10. Toothed segments on the pivoted ends of the type bars are engaged by rack teeth formed upon the lower ends of corresponding actuating bars 68, the teeth being held in mesh and the lower ends of the actuating bars guided by a segmental bar 69 which is carried by the type bar segment. Springs 71 connected to the bar 69 and to rearwardly projecting offsets on the actuating bars hold the latter and the type bars in normal position with the type bars engaging a segmental rest 72, and with the actuating bars pressed lightly against the forward edge of a common operating or striker bar 73. The upper ends of the actuating bars extend through guiding radial slots formed in the forward edge of the fixed segmental plate 40 and are disposed in front of the five notched permutation bars 38. The striker bar 73 is segmental in form and is centrally fixed to the upper end of a vertical plunger 74 which is slidably mounted in suitable bearings upon an upright bracket or frame member 11 and which frame member also supports the segmental plate 40.

As in the construction shown in the Morton and Krum application referred to, the plunger 74 and striker bar 73 are raised and lowered by a bell-crank lever having a horizontal arm 75 extending within an opening in the plunger and a vertical arm 76 provided with a roller 77 which is engaged by a cam 78 mounted upon the vertical actuating shaft 21. A spring 79 connected to the horizontal arm 75 of the bell-crank lever effects the upward or operating movement of the plunger and striker bar as the cam 78 is rotated. The latter is intermittently operated from the shaft 21 through the medium of a suitable clutch (not shown), and which is tripped into operation at the end of each signal by a tooth or lug 80 (see Fig. 2) formed upon the cam member 20. As the setting of the primary selectors 12 in response to any signal is completed, the tooth or lug 80 engages an arm 81 and trips the operating clutch to thereby effect the rotation of the cam 78 and the reciprocation of the plunger 74 and striker bar 73.

The striker bar normally engages inclined cam portions 82 on the rear edges of the actuating bars 68 (see Fig. 3), and so holds them out of engagement with the notched permutation bars, but as the striker bar rises, the springs 71 rock the actuating bars into engagement with the permutation bars and one of the actuating bars moves into the aligned notches of the permutation bars so that a shoulder 83 thereon is moved into the path of the striker bar and the selected actuating bar is thereby shifted longitudinally to effect the printing movement of the corresponding type bar. Fig. 3 shows one of the type bars in its normal position in full lines and in its striking position in dotted lines.

The paper tape upon which the characters are printed passes through a guide 84 (see Figs. 1 and 3) mounted on a U-shaped bracket 86 and over a roller platen 87, the tape being held in engagement with the roller platen by a pressure roller 88 that is connected to the platen by gears 89. A horizontal shaft 90 is rotatably and slidably mounted in front and rear brackets 91 and 92, which project upwardly from the base plate 10, and extends through the arms of the U-shaped bracket 86 and through the roller platen 87. The latter is keyed to the shaft to rotate therewith, suitable letter space feed mechanism (not shown) being provided for rotating the shaft and advancing the platen and paper tape step by step.

Each of the type bars is provided with two characters, a letter or "lower case" character 93, and a figure, punctuation mark or "upper case" character 94, and by axially shifting the shaft 90, bracket 86 and platen 87, the tape is positioned to receive the impact of either type on the selected type bar, as indicated in full and dotted lines in Fig. 3. To guide the shift movement of the platen and hold the bracket 86 against rotation, a horizontal stud 95 projects rearwardly from the bracket 91 through an opening in the front arm of the bracket. Stop collars 96 adjustably mounted on the forward end of the shaft 90 and an adjustable stop screw 97 on the bracket 91 limit the shift movement of the platen.

The shift movement of the platen is effected by a rocking bail 98 pivotally mounted on posts 99 and having an upwardly projecting arm 100 (see Fig. 3), which engages a V-shaped notch in the end of an arm 101 which projects rearwardly from the bracket 86. The tape is nearly as wide as the passageway through the guide 84 and the shift of the platen is preferably so adjusted that, as indicated in Fig. 3, letters or "lower case" characters are printed adjacent one margin of the tape and figures or "upper case" characters on the other margin.

The platen shift is effected by two actuating bars 104 and 105 which, like the actuating bar 68, are guided at their upper and lower ends in the slots of the comb bar 40 and of the type bar segment 64, the lower end portions of the bars being arranged between rollers 106 mounted upon the rod 65 and the

segmental bar 69. Preferably, also, the upper ends of these bars extend through openings formed in guiding pieces 107 that are fixed to the underside of the comb bar 40 and project inwardly therefrom.

The actuating bars 104 and 105 are shifted upwardly by vertical springs 108, but are normally held in depressed position by the engagement of the striker bar 73 with the laterally projecting lugs 109 formed on the actuating bars. The lower ends of the bars are provided with inwardly projecting lugs 110, one extending beneath the arm 111 of the bail 100 and the other beneath one end of the lever 112. The latter is pivotally mounted intermediate its ends on a post 113 and its opposite end extends over the bail arm 114. As is obvious from an inspection of Figs. 2 and 3, when the actuating bar 105 is shifted vertically by its spring, the bail will be rocked to move the platen to its "figures" position, and when the actuating bar 104 is shifted, the platen will be restored to normal or "letters" printing position.

In the construction shown in the prior application, Serial No. 757,661, the shift actuating bars, like the type actuating bars, are selectively controlled by the five notched permutation bars in response to special "figures" and "letters" shift signals. The present apparatus is particularly designed for use with stock tickers and the like, in which shift operations are quite frequent. For this purpose, the present printer is responsive to code signals having six selecting intervals or units and, as shown in Fig. 2, the operating cam 20 is provided with six teeth and an additional lever 17, primary selector 12, and T-lever 37 are provided. This sixth primary selector positions a special controlling bar 115 which, in the construction shown, is segmental and is arranged below the notched permutation bars 38 and immediately above the comb bar or plate 40. Like the notched permutation bars, it is held in position by the studs 39 and its longitudinal movement to either one of two positions is limited by the studs which extend through short slots 116 in the bar.

Except at its ends, the controlling bar 115 is cut away at its forward edge so that it takes no part in the selection of the type actuating bars 68. At its ends, the controlling bar is provided with forwardly projecting lugs 117 which are so spaced that one of these lugs is over one of the shift actuating bars 104 or 105, while the other shift actuating bar is free to be moved upwardly by its spring as the striker bar 73 is raised. In the construction shown, the controlling bar 115, during the printing of letters, will occupy its left-hand position and the corresponding primary selector 12, its right hand position, shown in Fig. 2, and the platen will be in its rearmost position shown in Fig. 3. In this condition of the parts, the shift bar 105 will be prevented from moving upwardly, when the striker bar is raised, by one of the lugs 117, and while the shift bar 104 will be free to rise, its movement will have no effect upon the platen which is already in its "letters" printing position. If a signal is received for printing a figure or "upper case" character, it will be accompanied by a selecting interval or unit which will position the primary selector 12 corresponding to the controlling bar 115 in its left hand position, so that the controllng bar will be moved to its right hand position shown in Fig. 1. Then, when the striker bar 73 rises, the shift bar 105 will be lifted vertically by its spring and will rock the bail 100 to move the paper platen to its forward "figures" printing position. The platen will remain in this position until a "letter" or lower case character signal is received and the controlling bar 115 shifted back to the position shown in Fig. 2. Then, upon the upward movement of the striker bar, the vertical movement of the shift actuating bar 104 will move the paper platen back to "letters" printing position. It is noted that, when a shift is to be made in any operation, it will be effected during the initial part of the upward movement of the striker bar and before the latter effects the operation of the selected type bar. It is also noted that the shift mechanism retains either one of its two positions until a change is required in response to a received signal. It is also noted that during the printing of a character, one of the spring-actuated bars 104 or 105 will hold the platen and paper tape in proper position.

Obviously, changes may be made in the details set forth without departure from the features of the invention as defined in the appended claims.

I claim as my invention:

1. In a telegraph printer responsive to a definite unit code, a "case" shift device, two actuators individually spring operated to move said shift device to either one of two positions, and a controlling member responsive to one of the units of the code combinations for selectively permitting the operation of one or the other of said shift actuators.

2. In a telegraph printer responsive to a definite unit code, a "case" shift device two actuators individually spring operated to move said shift device in opposite directions respectively to either one of two positions, and a controlling member responsive to one of the units of the code combinations for selectively determining the operation of said actuators, and a striker mechanism normally holding said actuators in retracted position with their operating springs under tension and permitting the operation of the selected shift actuator in advance of the complete operation of said striker mechanism.

3. In a telegraph printer, a set of selectors responsive respectively to the pulses of definite unit code signals, a pair of case-shift actuators selectable under the sole control of one of said selectors, character determining members selectable under the joint control of the other of said selectors, springs for operating said shift actuators and striker mechanism for successively permitting the operation of the selected one of said actuators and effecting the printing of the selected character.

4. In a telegraph printer responsive to definite interval code combinations, a "case" shift member, a set of selectors movable to either one of two positions in response respectively to the corresponding selecting pulses of the received code combinations, a pair of actuators selectable under the sole control of one of said selectors and in one-way-engagement with said shift member for moving the same back and forth to either one of two positions, a plurality of members selectable under the joint control of the other of said selectors and striker mechanism cooperating with said shift actuators and said selectable members to effect the successive operation of one of said actuators and the printing of the selected character.

5. In a telegraph printer responsive to definite interval code combinations, a "case" shift member, a set of longitudinally movable selector bars adapted to be positioned in different combinations in response to corresponding units respectively of the received code combinations, a pair of actuators individually spring operated to position said shift member and selectable under the sole control of one of said selector bars, a plurality of members selectable under the joint control of the other of said selector bars, and striker mechanism arranged to cooperate successively with said actuators and members for effecting the printing of the selected characters.

6. In a telegraph printer responsive to definite interval code combinations, a "case" shift device, a pair of actuators in one-way engagement with said shift device and spring operated to move the same in opposite directions respectively to either one of two positions, a set of notched permutation selectors responsive to corresponding impulses respectively of the received signals, a plurality of members selectable by movement into the aligned notches of said selectors, an additional selector responsive to one of the impulses of each code combination solely to control said shift actuators, and striker mechanism arranged to cooperate successively with the selected actuator and member to effect the printing of the corresponding character.

7. In a telegraph printer responsive to definite interval code combinations, a "case" shift device, a pair of actuators in one-way engagement with said shift device and spring operated to move the same in opposite directions respectively to either one of two positions, a set of permutation bars and an additional selector bar responsive respectively to corresponding units of the received code combinations, said additional selector bar being operative solely to control said shift actuators, a plurality of type-bars, individual actuators therefor, selectable under the joint control of said set of permutation bars, and a striker bar arranged to successively permit the operation of the selected shift actuator and effect the operation of the selected type-bar actuator.

8. In a telegraph printer responsive to definite interval code combinations, a "case" shift device, a pair of actuators in one-way engagement with said shift device and spring operated to move the same in opposite directions respectively to either one of two positions, a set of notched permutation bars and an additional controlling bar longitudinally movable in response to corresponding units respectively of the received code combinations, said controlling bar being operative solely to condition one of said shift actuators for operation, a plurality of type-bars, actuators therefor selectable by movement into the aligned notches of said permutation bars, and a striker bar for operating the selected type-bar actuators, said striker bar, in its retracted position, serving to hold said shift actuators retracted with their operating springs under tension.

9. In a telegraph printer, a tape guide and platen, a plurality of type-bars, a set of selectors, a pair of shift actuators selectable under the sole control of one of said selectors and spring actuated to move said tape guide and platen to either one of two positions, a plurality of type-bar actuators selectable under the joint control of the other of said selectors, and striker mechanism for successively permitting the operation of the selected shift actuator and the operation of the selected type-bar actuator.

10. In a telegraph printer, a tape guide and platen, a plurality of type-bars, a pair of longitudinally movable actuating bars selectable under the sole control of one of said selector bars and having one-way connections with said tape guide and platen for reciprocating the same transversely to the path of movement of the tape to either one of two positions, a plurality of longitudinally movable actuating bars connected to said type-bars and selectable under the joint control of the other of said selector bars, and a common striker bar arranged to cooperate successively with the selected shift and type actuating bars to effect the printing of the selected characters.

11. In a telegraph printer, a tape guide

and platen, a plurality of type-bars, a segmental series of longitudinally movable actuating bars, for effecting the relative case-shift movements of said platen and type-bars and the striking movements of said type-bars, and segmental selector and striker bars cooperating with said actuating bars, said shift actuating bars being selectable under the sole control of one of said selector bars and operable under control of said striker bar in advance of the operation of the selected type actuating bar.

12. In a telegraph printer, a tape guide and platen, a plurality of type-bars, a segmental series of longitudinally movable actuating bars, two of said actuating bars being spring operated and having one-way connections with said tape guide and platen for effecting the case-shift movements thereof and the other actuating bars being connected directly to said type-bars, a segmental series of selector bars, one having lugs for blocking the movement of one or the other of said shift actuating bars and the others having notches arranged to be aligned to select one of said type actuating bars, and a segmental striker bar cooperating directly with said actuator bars and adapted, upon its movement in one direction, to first permit the movement of the selected shift actuating bar and then effect the operation of the selected type actuating bar.

13. In a recorder responsive to code permutations, a "case" shift member, a set of selectors, each movable to either one of two positions in accordance with the code permutations, a pair of actuators and a plurality of character members selectable under control of said set of selectors, said actuators being in one-way engagement with said case shift member for moving the same back and forth to either one of two positions, means for maintaining said shift member in position until a change is required responsive to a code permutation, and mechanism co-operating with said shift actuators and said selectable character members to effect the successive operation of one of said actuators and the operation of the selected member.

14. In a recorder responsive to permutation code signals, a "case" shift member, a set of longitudinally movable selector bars adapted to be positioned in different combinations in response to corresponding units respectively of the code signals, a plurality of character members and a pair of pivoted, case-shift actuators selectable under the control of said selector set, said actuators being operative to position each case-shift member, means for maintaining the latter in position until a change is required responsive to a code signal, and striker mechanism arranged to cooperate with the selected actuator and character member for effecting the successive operation thereof.

15. In a recorder responsive to definite interval code combinations, a set of permutation bars and an additional case-shift selector bar responsive to code combinations, means for maintaining said additional selector bar in position until a change is required in response to a code combination, a plurality of upper and lower case character members and a case-shift member, actuating devices for said character and case-shift members selectable under the joint control of said permutation bars and said additional bar, and a striker bar arranged to effect the operation of the selected actuating devices and the associated case-shift and character members.

16. In a recorder responsive to code permutations, a set of notched permutation bars and an additional bar longitudinally movable in response to code permutations, a case-shift mechanism, said bar being operative solely to control said case-shift mechanism, means for maintaining said additional bar in operated position until a change is required responsive to a code combination, a plurality of character members, actuators therefor selectable by movement into the aligned notches of said permutation bars, and a striker bar for operating the case-shift mechanism and the selected character actuators.

17. In a recorder, a tape guide and platen, a plurality of character bars, a set of selectors, a pair of shift actuators selectable under the sole control of one of said selectors and spring actuated to move said tape guide and platen to either one of two positions, a plurality of character bar actuators selectable under the joint control of the other of said selectors, and striker mechanism for successively permitting the operation of the selected shift actuator and the operation of the selected character bar actuator.

18. In a recorder, a plurality of longitudinally movable permutation bars, a plurality of upper and lower case character members, means for operating said permutation bars in accordance with received code combinations of impulse conditions for selecting an upper and a lower case character member, a member for controlling case-shift operations having an upper and a lower case-shift position, two separate actuators therefor, one for moving the case-shift operating member to one position and the other for moving it to its other position, said actuators being in one-way engagement with the case-shift member, means for maintaining said case-shift member in position until a change is required in response to a received signal, and a common operating device for said case-shift actuators and said character members.

19. In a recorder responsive to definite unit code permutations, a case-shift device, a set of selectors adapted to be positioned in different combinations in response to corresponding units respectively of the code per-

mutations, a pair of actuators selectable under the sole control of one of said selectors for positioning said shift member, the latter being arranged to retain its position until a change is required in accordance with a code permutation, a plurality of members selectable under the joint control of the other of said selectors, and mechanism arranged to cooperate successively with the selected actuator and member to effect the operation of a corresponding character device.

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