

May 4, 1943.

W. Y. LANG

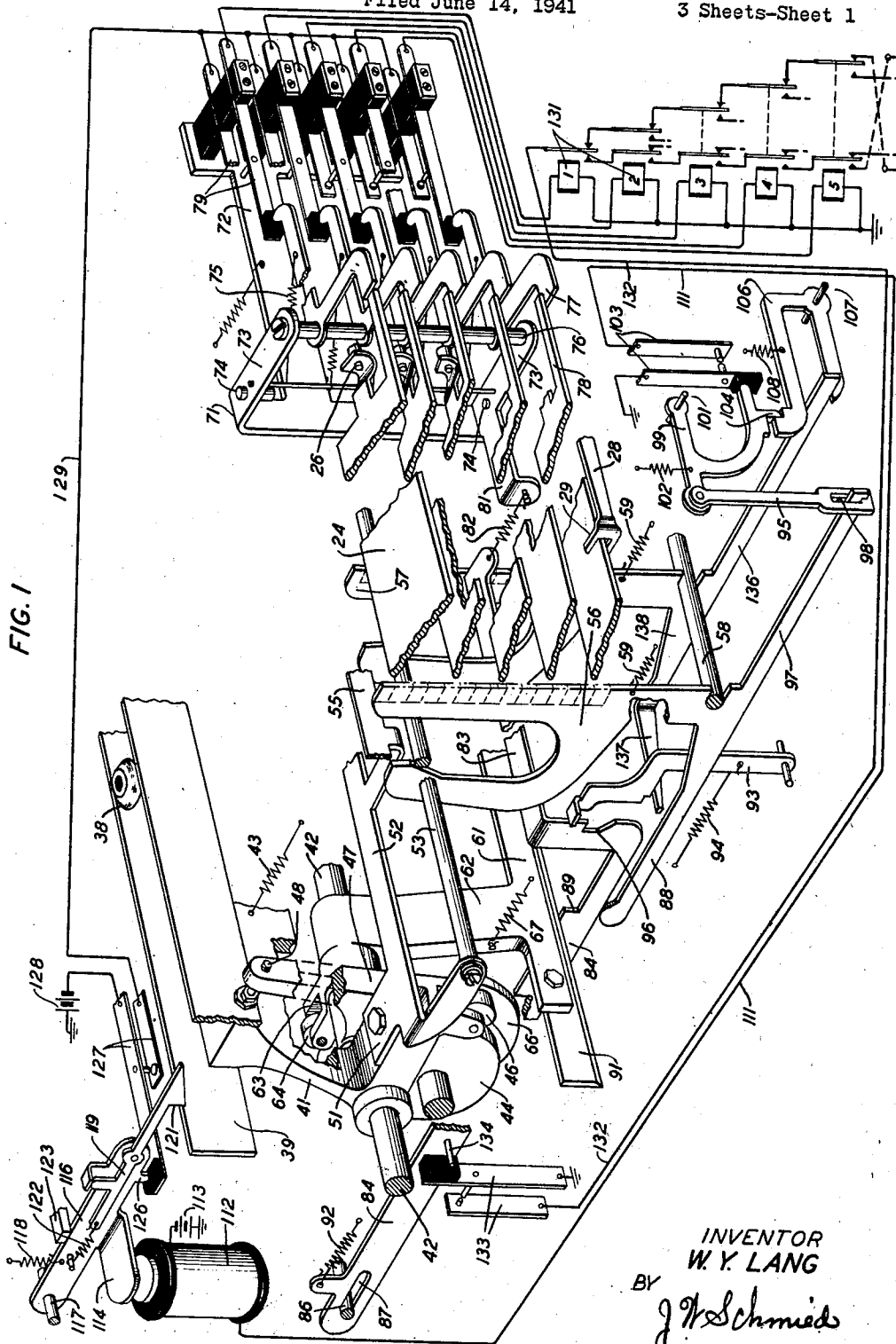
2,318,168

PRINTING TELEGRAPH APPARATUS

Filed June 14, 1941

3 Sheets-Sheet 1

FIG. 1



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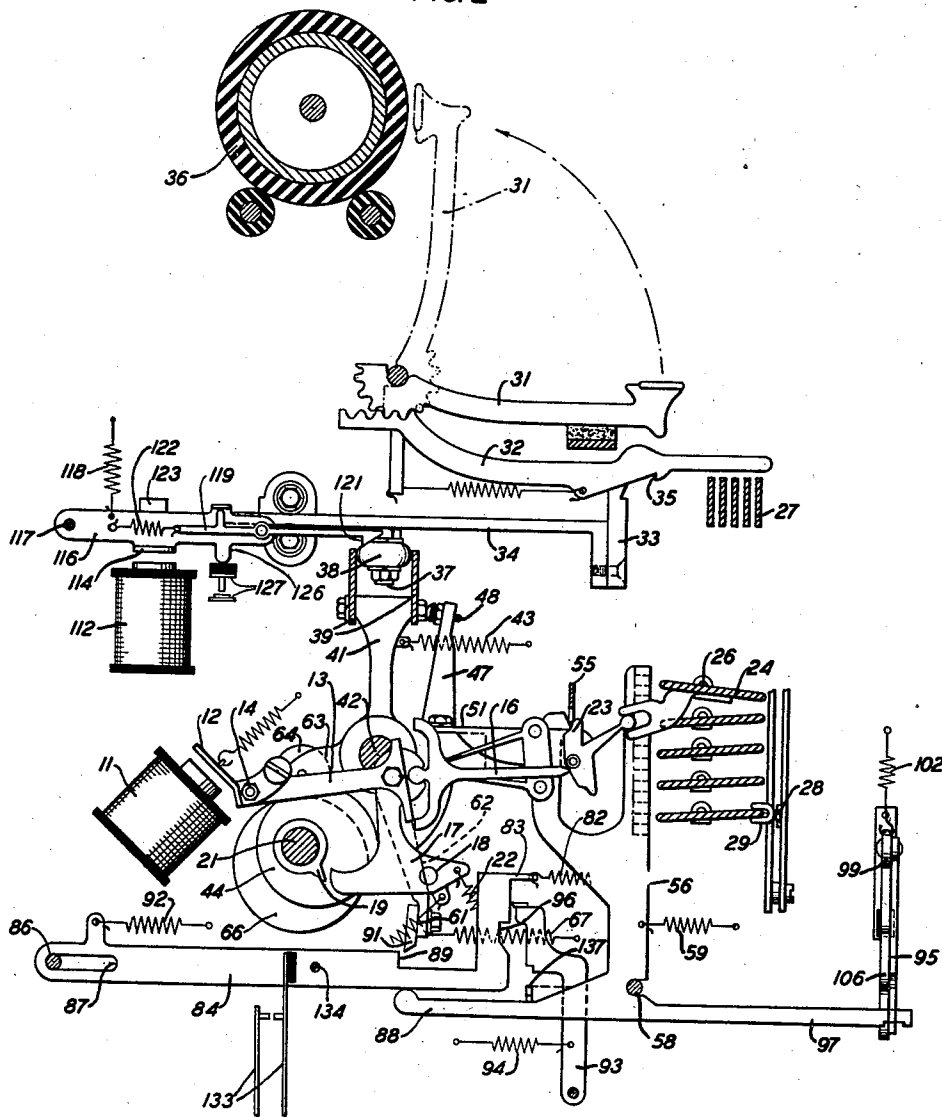
2,318,168

PRINTING TELEGRAPH APPARATUS

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3 Sheets-Sheet 2

FIG. 2



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PRINTING TELEGRAPH APPARATUS

Filed June 14, 1941

3 Sheets-Sheet 3

FIG. 3

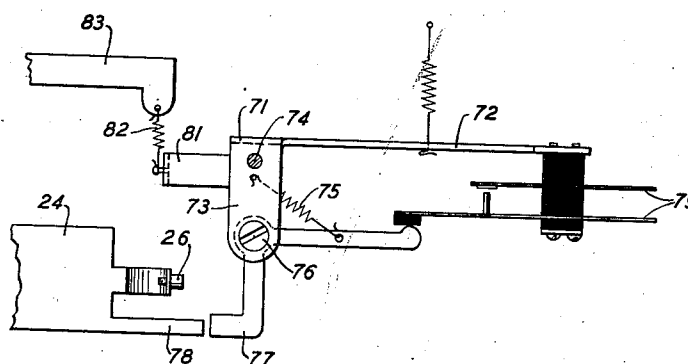
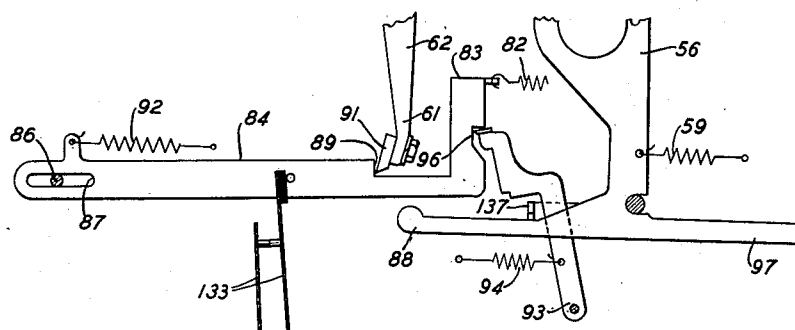


FIG. 4



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PRINTING TELEGRAPH APPARATUS

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Application June 14, 1941, Serial No. 398,055

22 Claims. (Cl. 178—23)

This invention relates to printing telegraph apparatus and particularly to switching facilities therefor.

An object of the invention is to provide a printing telegraph instrumentality which is operable alternatively and selectively to perform printing operations or switching operations.

Another object of the invention is to provide a telegraph printing and switching instrumentality in which the switching selections are additional to and substantially commensurate with the printing selections, either of which embraces substantially the full possibilities of the signaling code employed.

Another object of the invention is to provide a combined printing and switching telegraph instrumentality in which switching selections are derived independently of all printing control selectable elements and printer function control selectable elements except such of the latter as may be required to qualify and disqualify the switching instrumentality.

The invention features a telegraph printer having the printing elements mounted in a type basket which travels longitudinally of a cylindrical page width platen for character spacing and in which the switching selections are derived from selector members which control the selection of the printing elements.

The invention also features a switching control mechanism which is normally disabled and idle and which is not brought into effective cooperation with the printing control selectors after being qualified to perform switching operations.

In accordance with the preferred embodiment of the invention, the printing telegraph receiver into which a switching control mechanism has been incorporated may be of the type disclosed in Patent 1,904,164, granted April 18, 1933 to S. Morton et al., and the disclosure of this patent is incorporated herein by reference as a part of this specification. The printer shown in the foregoing patent is provided with a type basket which moves longitudinally of a cylindrical page width platen for character spacing and returns to a beginning-of-line position in response to an appropriate selective condition established by a received signal. The type basket is provided with a set of permutation code bars for selecting the printing elements and these bars are controlled from a set of signal responsive selector vanes through the agency of bell cranks which are mounted on the type basket and which have one end forked to embrace and travel along the edge of the selector vane as the type basket moves

relative to the platen. The setting of the selector vanes in accordance with received signals is accomplished by a permutation code responsive receiving selector mechanism. The permutation code bars carried by the movable type basket individually select pull bars that are articulated to the type bars and drop the pull bars into the path of a printing bail which is cyclically operated under the control of a main cam assembly.

The switching control mechanism comprises a rockable cradle which supports a plurality of pairs of electrical contact springs spaced substantially in accordance with the spacing of the selector vanes. Aligned with each of the pairs of electrical contact springs is a bell crank, one arm of which is in operative relation to its associated contact springs and the other arm of which is presented in the position occupied by an end portion of its associated selector vane when the vane is in marking position. Selectable mechanism is provided for causing the cradle which carries the sets of electrical contacts to be rocked by the function bail of the printer to cause the pairs of contact springs to rock their associated bell cranks toward the end of the selector vanes. Those of the selector vanes that are in marking position interfere with rotation of the bell cranks and cause the further motion of the pairs of contacts to result in closure of the pairs whereas those of the selector vanes that are presented in the spacing position do not interfere with the associated bell cranks and the bell cranks rock idly without effecting closure of their contacts. Electrical circuits controlled from the pairs of contacts establish switching conditions.

The mechanism which selectively qualifies the contact supporting cradle to be operated by the function bail controls apparatus for presenting a blocking member in the path of the printing bail which, as shown in the patent, is operated by a spring under the control of a cam and is restored to normal position by the cam, so that the printing bail is blocked and does not effect the operation of a printing pull bar. Thus a received code combination which is to effect a switching operation may also effect the selection of a printing pull bar but the pull bar will not be operated because the printing bail is blocked short of its printing stroke. The qualification and disqualification of the switching mechanism is controlled by selectable members similar to the function selectors shown in the hereinbefore identified patent which are controlled directly by the selector vanes.

For a complete understanding of the invention reference may be had to the following detailed description to be interpreted in the light of the accompanying drawings wherein:

Fig. 1 is a combined schematic perspective view and circuit diagram of the portion of a telegraph printer as exemplified in the foregoing patent with the addition thereto of the switching mechanism and related apparatus in accordance with the present invention;

Fig. 2 is a vertical sectional view through the receiving printer showing the switching contact qualifying and operating mechanism and the printing bail blocking mechanism;

Fig. 3 is a fragmentary plan view showing the switching contact mechanism; and

Fig. 4 is a fragmentary elevational view showing the switching contact operating mechanism in the operated condition.

Referring now to the drawings and particularly to Fig. 2, the reference numeral 11 indicates a selector magnet, the armature 12 of which is carried by a selector lever 13 pivoted at 14. As is fully disclosed in the Morton et al. patent, the selector lever 13 controls a plurality of sword levers 15 which are individually articulated to bell cranks 17 pivoted at 18 and individually rocked in counterclockwise direction once in each receiving cycle by cams 19, one of which is shown in Fig. 2, included in a receiving selector cam assembly mounted on and frictionally driven by a power driven shaft 21. Upon being retracted by their bell crank levers 17, the sword levers 16 are rocked into extreme clockwise or counterclockwise position depending upon the position of selector lever 13 as determined by selector magnet 11, and when they are shifted rightwardly by their bell cranks 17 as the bell cranks are restored to extreme clockwise position by their individual springs 22, the sword levers rock associated T-levers 23 into extreme clockwise or counterclockwise position depending upon the rotative position into which they have been rocked under the control of the selector magnet. The T-levers 23 are articulated by means of disc and slot connections to individual selector vanes 24 that are pivotally supported at their opposite ends by trunnions 26 (Figs. 1 and 2).

A movable type basket, full structural details of which are shown in the Morton et al. patent, supports permutationally notched code bars 27 that are individually connected to the selector vanes 24 by bell cranks 28, a portion of one of which is shown in Fig. 2. The upwardly extending arm of each bell crank 28 engages one of the code bars 27 and a laterally extending arm of each bell crank 28 terminates in a bifurcated portion 29 which straddles the edge of a selector vane and remains in engagement with the vane while moving along its edge as the type basket moves for character spacing and carriage return operations. The type basket pivotally supports a plurality of type bars 31 which have rack and pinion connection with individual selectable pull bars 32, the foremost ends of which are disposed above and in close proximity to the code bars 27. The pull bars 32 are normally supported with their foremost ends just out of engagement with the code bars 27 by engagement of a sloping cam surface on the lower edge of each pull bar 32 with a blade 33 carried by a reciprocable printing bail 34 which is mounted on the type basket. Each of the pull bars 32 is provided with a hook 35 near the upper end of the sloping cam surface so that when the printing bail 34 is reciprocated

rightwardly as viewed in Fig. 2 and the right-hand ends of the pull bars move downwardly into engagement with the code bars 27, any pull bar which finds an alignment of notches presented to it by the code bars will move still farther downwardly at its right-hand end into the alignment of notches, bringing its hook 35 into the path of blade 33 of printing bail 34 so that as the bail continues to be moved farther to the right, blade 33 will engage the selected pull bar and reciprocate it rightwardly, thus rocking the associated type bar 31 in counter-clockwise direction to bring its type carrying face into printing engagement with paper carried by a printing platen 36.

Printing bail 34 is provided with a depending stud 37 which rotatably supports a roller 38 disposed between a pair of blades 39 supported at the upper end of a printing bail operating arm 41. The roller 38 and blades 39 provide for operative engagement between printing bail 34 and operating arm 41 throughout the path of travel of the type basket by which printing bail 34 is supported. Operating arm 41 which is supported on rock shaft 42 is urged in clockwise direction by a tension spring 43 which supplies the power for operating the arm 41 and thus the bail 34. A printing cam 44 which is included in a main cam assembly carried by the shaft 21 is engaged by a roller 46 (Fig. 1) carried by a pivoted lever 47, the upper end of which supports an abutment screw 48 which engages the right hand side of the right-hand one of the operating arm blades 39 as viewed in Fig. 2. The cam 44 operates through lever 47 to restore operating arm 41 to extreme counterclockwise position and to hold it in that position in the idle condition of the apparatus. When the main cam assembly is released for rotation by the receiving selector cam assembly a sharp drop-off of the cam 44 permits the spring 43 to rock printing bail operating arm 41 sharply in clockwise direction to effect a printing operation, and during the remainder of the cycle of the main cam assembly the cam 44 restores operating arm 41 to extreme counterclockwise position which in turn restores bail 34 to its unoperated position.

Although only one printing bail operating arm 41 has been referred to in the foregoing paragraph, it will be understood that there are at least two such arms located near the ends of rock shaft 42 and that there may be others intermediate those two. Associated with the end ones of the arms 41 are brackets 51 (Fig. 1) interconnected by a bar 52 and supporting the ends of a function selection control rod 53 which extends parallel to the axes of the selector vanes 24. At the rear of the vanes 24 a plurality of selectable function levers, such as the levers 56 and 57 are pivotally mounted on a rod 58. Each of the selectable function levers is provided with two spaced upwardly extending arms. The arm of the selectable function lever that is nearest to the rear edges of the selector vanes is provided with permutation code combinations of lugs with which selector vanes presented in their spacing position interfere. When the selector vanes corresponding to all of the lugs of a selectable function lever are in their marking position, the function lever is not blocked but is free to rock in clockwise direction as viewed in Fig. 2. However, the rocking of the function levers is normally prevented by bar 53 carried by brackets 51 associated with the print bail operating arms. The rod 53 cooperates with a cam portion of the

rear arm of each of the function levers. When the printing bail operating arm 41 is operated by spring 43, the rod 53 is moved downwardly along the cam surface of the rear arm of each function lever and permits the function levers to rock in clockwise direction as viewed in Fig. 2 to test the setting of the selector vanes 24. Any function lever which finds no selector vanes blocking its lugs will be rocked in clockwise direction by its associated spring 59 to perform or initiate its assigned function as the case may be. The printing bail bar 52 carries an upturned flange 55 which overlies the tops of the rear arms of selectable function levers 56 and 57 and which moves down into engagement with the top of the rear arm of either of those levers when they are selected, the function of the flange being to block the printing bail mechanism after it has operated far enough to permit the selection of the function levers in order to suppress operation of any pull bar 32 that may also be selected.

Those functions which require more power for their performance than the springs 59 can supply, or the performance of which should be prolonged over a greater interval than that involved in the rocking of its function lever to the extreme clockwise position as viewed in Fig. 2, are performed by a function bail 61 supported by operating arms 62 journaled on rock shaft 42. Associated with one of the function bail operating arms 62 is a cam follower lever arm 63 which supports at its free end a roller 64 which engages cam 66 included in the main cam assembly. When the main cam assembly is rotated the function bail operating arms 62 are positively rocked in slightly counter-clockwise direction by spring 67 under control of cam 66, then in clockwise direction as viewed in Fig. 2 by cam 66 and thereafter the function bail 61 is restored to normal, which is short of extreme counter-clockwise position, by spring 67. The manner in which function bail 61 operates function performing members will be described hereinafter.

Referring now to Figs. 1 and 3, it will be noted that a cradle 71 consisting of a flat plate 72 and parallel arms 73 is pivotally supported by trunnions 74 which engage the arms 73 near the inner ends thereof. Extending between and supported by the outer ends of arms 73 is a pivot rod 76 which pivotally supports a plurality of bell cranks 77 in alignment with the marking position of fingers 78 integral with and extending rightwardly from the right-hand ends of the selector vanes 24. The free end of one arm of each of the bell cranks 77 is aligned with the marking positions of the fingers 78. The plate 72 of cradle 71 supports a plurality of pairs of normally open electrical contact springs 79, there being a pair of electrical contacts assigned to and aligned with the other arm of each of the bell cranks 77.

Cradle 71 is provided with an operating arm 81 which is connected by spring 82 with the free end of a laterally extending arm 83 of a push bar 84. Push bar 84 is mounted for reciprocable movement leftwardly, as viewed in Fig. 4, by pin 86 which passes through a slot 87 in the push bar 84.

The foremost end of push bar 84 is supported by a rearwardly extending arm 88 of selectable function lever 56. Near its foremost end the push bar 84 is provided with a notch in its upper edge which provides a shoulder 89 disposed slightly to the rear of the position occupied by a blade 91 carried by function bail 61 when the bail is in

its extreme forward position. The push bar 84 is urged to its extreme forward position (rightward position as viewed in Fig. 2) by a tension spring 92 which engages bar 84 above its axis and also imparts a clockwise movement of torque to the bar. When the function lever 56 is in its normal or retracted position, its arm 88 supports the foremost end of push bar 84 at a level below the function bail blade 91 so that the shoulder 89 is out of the path of the bail blade.

When the selectable function lever 56 is selected by the selector vanes 24 and is rocked in clockwise direction by its spring 59 under the control of rod 53 associated with the printing bail operating arm 41, the foremost end of push bar 84 is elevated to bring the shoulder 89 into the operating path of function bail blade 91. A latch 93 biased in counter-clockwise direction as viewed in Figs. 1, 2 and 4 by a tension spring 94 engages the front edge of a vertically extending portion of the push bar 84 and when the foremost end of the push bar is lifted by arm 88 of selectable function lever 56, the upper end of latch 93 enters a notch 96 in the vertical portion of the bar and holds the bar in elevated position.

Following the latching of the push bar 84 in elevated position, cam 66 rocks function bail 61 in clockwise direction and since shoulder 89 of push bar 84 is now in the operating path of blade 91 of function bail 61, the blade engages shoulder 89 and reciprocates push bar 84 rearwardly of the printer (leftwardly as viewed in Figs. 2 and 4). Arm 83 of push bar 84 moves rearwardly with the push bar and imparts through spring 82 clockwise movement to cradle 71 as viewed in Figs. 1 and 3. The pairs of contact springs 79 carried by the cradle 71 are moved in an arcuate path about the trunnions 74 as an axis and since the bell cranks 77 are held in engagement with their respective contact springs by tension springs 75, which exert insufficient tension to close the springs, the bell cranks 77 are moved arcuately in clockwise direction about the axis of trunnion 74. After the bell cranks 77 have been rocked through a very short angular distance those of the selector vanes 24 that are then presented in the marking position will block, by means of their fingers 78, further movement of the bell cranks 77 associated therewith, so that the bell cranks will be arrested. As the cradle 71 continues to move to its fully operated position with certain of the bell cranks 77 blocked by the selector vanes 24, the corresponding electrical contact springs yield in order to be further moved while their bell cranks are blocked, and in so yielding the contacts are closed. In this way the closing of pairs of contacts 79 in permutational combinations corresponding to the setting of the selector vanes 24 may be accomplished.

As shown in Figs. 1 and 2, the selectable function lever 56 has a forwardly extending arm 97 (rightwardly extending as viewed in Fig. 2) the foremost end of which is presented in a slot 98 in a link 95 which is pivotally articulated to and depends from a bell crank 99 pivoted at 101 and urged in clockwise direction as viewed in Fig. 1 by tension spring 102. The free end of a downwardly and rightwardly extending arm of bell crank 99 abuts one spring of a pair of electrical contact springs 103 which are normally open. The downwardly and rightwardly extending arm of bell crank 99 is provided with a depending lug 104 which cooperates with either of two shoulders of a latch 106 pivoted at 107 and biased

in clockwise direction by a tension spring 103. The left-hand shoulder of the latch 106 holds the bell crank 99 in the normal or unoperated position and when selectable function lever 56 is selected and is rocked in clockwise direction, its arm 97 moves link 95 downwardly, thus rocking bell crank 99 in counter-clockwise direction to cause its depending lug 104 to move out of engagement with the left-hand shoulder and to move clear of the right-hand shoulder whereupon spring 108 rocks latch 106 in clockwise direction to cause the right-hand shoulder to move into blocking relation to lug 104 whereby bell crank 99, having closed the electrical contacts 103 is latched in the operated position.

One of the contacts 103 is connected to ground and the other is connected by a conductor 111 to one terminal of an electromagnet 112, the other terminal of which is connected to grounded battery 113. Thus upon the closure of contacts 103, the energizing circuit for electromagnet 112 is completed and the electromagnet becomes energized and attracts its armature 114 which is carried by a lever 116 pivoted at 117 and biased in counter-clockwise direction as viewed in Figs. 1 and 2 by a tension spring 118. Following the latching of bell crank 99 selectable function lever 56 is restored to normal position by rod 53 in accordance with the operating cycle of the receiving printer and the slot 98 in link 95 accommodates restoration of the function lever 56 to normal, permitting bell crank 99 to remain in operated position and link 95 in its lowermost position.

Lever 116 which is operated by electromagnet 112 pivotally supports a lever 119 which is provided with a latching shoulder 121 for the left hand one of the printing bail operating arm blades 39 as viewed in Fig. 2, and with a pointed or tapered end. Lever 119 is normally maintained in a predetermined position with respect to magnet controlled lever 116 by means of a tension spring 122. When magnet 112 is deenergized spring 118 holds lever 116 against a stop 123 with shoulder 121 of lever 119 out of latching or blocking relation to the print bail operating blade 39. When magnet 112 becomes energized it rocks lever 116 in clockwise direction to bring shoulder 121 of lever 119 into a position below the upper edge of the rearmost blade 39. If print bail operating arm 41 is at this time in its normal or unoperated position, the shoulder 121 of lever 119 will be disposed in the path of blade 39 so as to prevent the movement of the printing bail to its operated position which, it should be remembered, is permissive, since the bail is operated by spring 43 and is restored by cam 44. If at the time the magnet 112 becomes energized, the printing bail is partially or fully operated, some portion of the tapered or pointed end of the lever 119 will drop into engagement with the top of blade 39 and when the printing bail is restored to its normal or unoperated position, the lever 119 will be cammed in counter-clockwise direction by the cooperation of its tapered end with the upper edge of the blade 39 until the blade has been moved clear of the shoulder 121. The rocking of lever 119 by blade 39 causes spring 122 to become distended and as soon as blade 39 clears shoulder 121, the spring 122 will restore lever 119 to its normal relation to lever 116, thus presenting shoulder 121 in the path of blade 39 to block the printing bail 34. Thus as long as bell crank 99 remains latched by latch 106, contacts 103 remain closed and lever 119 remains in blocking

relation to the print bail operating mechanism so that the print bail cannot be operated to effect printing. It should be noted that the full operating stroke of the printing bail 34 is not blocked but only that it is blocked sufficiently short of its full stroke to prevent its blade 33 from engaging the hook 35 on any selectable pull bar 32 that may be selected. The partial stroke of the print bail operating arm 41 that is permitted before blade 39 comes into engagement with shoulder 121 of blocking lever 119, is sufficient to permit rod 53 to move downwardly along the cam surfaces of the rear (left-hand) arms of the selectable function levers such as 56 and 57 to permit the function levers to test the setting of the selector vanes 24 and to permit the selection of any such function lever which is not blocked by the selector vanes.

Instead of providing for blocking of the printing bail by cooperation of shoulder 121 of lever 119 with one of the blades 39, the lever 119 may be arranged to cooperate with and block one of the printing bail operating arms 41. For example, the magnet 112 and lever 116 may be mounted lower in the printer to present the pointed end of lever 119 in alignment with an aperture cut through a print bail operating arm 41. With the arm 41 in the normal or retracted position, the foremost or pointed end of lever 119 would extend through the aperture in the arm 41 with the shoulder 121 in position to be dropped into blocking engagement with the arm 41. As in the structure shown in Figs. 1 and 2, the pointed end of lever 119 would guide the lever into the aperture upon retraction of arm 41 from its operated to its unoperated position.

The armature operated lever 116 is provided with a depending lug 126 which engages one of the springs of a normally open pair of electrical contact springs 127. When electromagnet 112 becomes energized and moves lever 116 into its operated position, the lever closes electrical contact springs 127 and they remain closed as long as electromagnet 112 remains energized.

One of the electrical contact springs 127 is connected to grounded battery 128 and the other spring is connected by conductor 129 to one spring of each of the pairs of electrical contact springs 79 that are selectively controlled by the selector vanes 24. The other spring of each of the five sets of contact springs 79 is connected to one terminal of the winding of an individual one of five switching relays 131. The other terminal of each relay is connected to ground. The first of the relays 131 is provided with a single armature operable between a front contact and a back contact. The second of the relays 131 is provided with two armatures, one of which is connected to the front contact of the first relay and the other is connected to the back contact. The second relay may have a back contact and a front contact for each of its two armatures and these contacts may be connected to four armatures of the third relay. The number of armatures and sets of front and back contacts progresses thus by doubling in fan circuit manner until the last of the five relays 131 is reached which may have as many as sixteen armatures to cooperate with a maximum of thirty-two contacts to which may be connected relays to perform switching operations. The single armature of the first relay 131 is connected by conductor 132 to one spring of a pair of electrical contact springs 133 the other of which is connected to ground. The contact springs 133 are normally

open and one of the springs has a portion disposed in the path of a pin 134 extending laterally from and carried by the push bar 84. Preferably, the pin 134 is positioned on push bar 84 to close the contacts 133 shortly before push bar 84 reaches the limit of its operating stroke, and well after it has closed those of the contacts 79 which correspond to selector vanes 24 in marking position. This will insure that the energizing circuits for all of the relays 131 that are to be energized have been completed and the armatures of those relays move into their operated positions to establish a single conductive path through the fan circuit system controlled by the armatures before ground is applied through the contacts 133 and conductor 132 to the armature of the first relay 131 and thus through the established fan circuit path to the switching device to be operated which, it will be understood, has a battery connections to provide energizing current for the switching device through the closed fan circuit path and through conductor 132 to the ground at contacts 133.

The selectable function lever 57 is provided with a forwardly extending arm 136 (rightwardly as viewed in Fig. 1) which is disposed above the lower arm of latch 106. The selectable function lever 57 is also provided with a rearwardly extending arm 138 which has a laterally extending portion 137 terminating below a shoulder 135 of the latch 93 for the push bar 84. Upon the selection and operation of selectable function lever 57, its forwardly extending arm 136 rocks latch 106 in counter-clockwise direction to release bell crank 99 which escapes from the latching shoulder of latch 106 and returns to normal position in engagement with the left-hand or normal retaining shoulder of the latch. The laterally extending portion 137 of the rearwardly extending arm 138 of selectable function lever 57 moves upwardly to block shoulder 135 of latch 93 and prevents the latch from following push bar 84 when the latter is operated by bail 61. With the latch 93 held the push bar, in being operated, is moved free of the latch 93 and is restored to extreme clockwise position by spring 92, thus moving its shoulder 89 out of the path of function bail blade 91. It will be understood by comparison of Fig. 2 with Fig. 4 that when the function lever 57 is in its normal or unselected position, the laterally extending portion 137 of the rearwardly extending arm 138 of the function lever is sufficiently remote from the body of latch 93 that the latch may follow push bar 84, as the push bar is reciprocated rearwardly of the printer, without being arrested by the laterally extending portion 137 of the arm of selectable function lever 57 and becoming disengaged from the push bar 84. From the foregoing it will be apparent that when selectable function lever 57 is operated, it unlatches the bell crank 99 so that the energizing circuit for electromagnet 112 is opened at the contacts 103 and the disablement of the printing bail is terminated, that contacts 127 are opened to disconnect battery from the contact springs 79, and that push bar 84 is disabled so that contacts 79 are not operated idly during printing operation and contacts 133 are not operated to complete a circuit through the outermost armatures and back contacts of the relays 131.

When the combined printer and switching selector according to the present invention receives a code combination which is to indicate switching operations, the selectable function lever 55 is selected and operated to latch up the push bar 75

84 and to complete the energizing circuit for magnet 112 which blocks the printing bail and connects battery to the contacts 79. In timed relation following the operation of the selectable function lever 55 the function bail 61 operates and reciprocates push bar 84 to close certain of the contacts 79 in accordance with the signal combination set up in the selector vanes 24, and subsequently to close the contacts 133. Upon the closure of the contacts 133 following the energization of certain of the relays 131, ground is connected to the armature of the first relay and if the relays have full complements of armatures and contacts, through one contact and armature of each of the relays to one of the contacts of the last of the relays 131. Preferably this contact is not connected to switching mechanism since the code combination at this time set up is that which conditions the printer to perform switching operations and would not ordinarily be intended to accomplish a switching operation although it may be desirable to provide apparatus controlled through the particular fan circuit path established at this time for performing a preliminary conditioning operation with respect to the switching apparatus.

The next code combination received should be one for performing a switching operation. Such code combination presumably will not cause the selection of any of the selectable function levers although it may correspond to a character which the printer is capable of printing and, accordingly, may establish in the code bars 27 a selective alignment of notches for one of the selectable pull bars 32. The character will not be printed because the printing bail is blocked, but upon the operation of the function bail 61 the contacts 79 will be closed in a permutational combination corresponding to the signal received, to energize corresponding ones of the relays 131. Thereafter, upon the closure of the contacts 133, ground will be connected through a fan circuit path established by the relays 131 to effect the operation of switching apparatus, such as an electrical relay. As many switching operations as desired may be accomplished by the reception of appropriate signals while the bell crank 99 and slidable member 84 remain in latched condition. After all of the desired switching operations have been performed, the code combination for selecting the function lever 57 should be transmitted for reception by the selector magnet 11. Upon being operated the function lever 57 trips latch 106 and blocks latch 93 to release bell crank 99 and push bar 84, which return to their normal idle conditions, thereby releasing electromagnet 112 and disabling the mechanism for rocking cradle 71 and for closing contacts 133. Thereafter the receiving printer will operate normally in response to received signal combinations and the printing bail 34 will operate pull bars 32 for the printing of characters corresponding to received signals.

It should be noted that the all-spacing or blank signal is a usable signal for performing switching functions. This signaling condition is represented by deenergized condition of all of the relays 131, which is the normal or idle condition, with a fan circuit path completed through the outermost armature and back contact of each of the relays. Although this path is normally maintained complete through the fan circuit system, no complete conductive path is established because ground is disconnected from the conductor 132 at the contacts 133. Upon the operation of

selectable function lever 56 to condition the apparatus for switching operations followed by the transmission of the blank signal combination, the selector vanes 24 will be placed in their spacing positions and when cradle 71 is rocked none of the contacts 79 will be closed so that all of the relays 131 will remain deenergized. However, upon the closure of contacts 133 following the rocking of the cradle 71, ground will be connected over conductor 132 to the fan circuit path corresponding to the all-spacing condition, and if a switching control relay is included in this path, such relay will be operated. For example, it may be found desirable to assign to the all-spacing signal, the function of operating a relay to release the holding circuit for any or all relays that may have been operated under the control of the fan circuit relays 131. Such release would be accomplished at the conclusion of transmission to stations selected by the switching apparatus by sending the code combination to select the function lever 56, followed by the all-spacing signal to effect the completion of a conductive path from the ground at contact 133 through the all-spacing path of the fan circuit, whereafter the signal for selecting the function lever 57 could be transmitted for restoring the combined receiving and switching printer to normal printing condition. As an alternative operating routine, from the standpoint of the last step mentioned in the foregoing sentence, the transmission of the signal for selecting the function lever 57 could be omitted, thus leaving the combined printing and switching mechanism in the switching condition. The next transmission could be started by signals for performing switching operation without the transmission of the conditioning signal.

Although a specific embodiment of the invention has been shown in the drawings and described in the foregoing specification, it is to be understood that the invention is not limited to such specific embodiment but is capable of modification and rearrangement without departing from the spirit of the invention and within the scope of the appended claims.

What is claimed is:

1. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of printing members individually selectable by said selector elements, means for operating said printing members following the selection thereof, electrical contact means for cooperating with said selector elements in combinations corresponding to the setting of said selector elements, means for operating said electrical contact means into cooperation with said selector elements, and means for disabling said printing member operating means and for conditioning said electrical contact operating means to be activated.

2. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing members following the selection of their associated selectable elements, electrical contact means for cooperating with said selector elements in combinations corresponding to the setting of said selector elements, means for operating said electrical contact means into cooperation with said selector elements, and means controlled by one of said selectable elements for disabling said printing member operating means and for condi-

tioning said electrical contact operating means to be activated.

3. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing members following the selection of their associated selectable elements, electrical contact means for cooperating with said selector elements in combinations corresponding to the setting of said selector elements, means for operating said electrical contact means into cooperation with said selector elements, and means controlled by a selectable element having no printing member associated therewith for disabling said printing member operating means and for conditioning said electrical contact operating means to be activated.

4. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing members following the selection of the selectable elements associated therewith, electrical contact means for cooperating with said selector elements in combinations corresponding to the setting of said selector elements, means for operating said electrical contact means into cooperation with said selector elements, means controlled by one of said selectable elements for disabling said printing member operating means and for conditioning said electrical contact operating means to be activated, means for retaining said disabling means and said conditioning means in operated condition, and means controlled by another of said selectable elements for disabling said retaining means.

5. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing members individually selectable by said selector elements, means for operating said printing members upon selection thereof, a plurality of switching contacts adapted to be controlled by said selector elements, means for yieldably holding said contacts out of cooperation with said selector elements, normally disabled means for bringing said contacts into cooperation with said selector elements, and means for disabling said printing member operating means and for conditioning said normally disabled means to be operated.

6. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing members individually selectable by said selector elements, means for operating said printing members upon selection thereof, a plurality of switching contacts, a plurality of contact operating means interposed between said contacts and said selector elements, means for yieldably holding said contact operating means out of cooperation with said selector elements, normally disabled means for bringing said contact operating means into cooperation with said selector elements and into cooperation with said contacts, and means for disabling said printing member operating means and for conditioning said normally disabled means to be operated.

7. In a printing telegraph receiver, a set of selector elements presentable in either of two positions responsive to received signals, a plurality of printing members individually selectable by

said selector elements, means for operating said printing members upon selection thereof, a plurality of switching contacts, a contact operating member in registry with one of the two selective positions of each selector element, means for yieldably holding said contact operating members out of cooperation with said selector elements, normally disabled means for bringing said contact operating elements into cooperation with those of the selector elements that are in the positions with which said contact operating members register, and for bringing the associated contacts into cooperation with their operating member and means for disabling said printing member operating means and for conditioning said normally disabled means to be operated.

8. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing instrumentalities individually selectable by said selector elements, means for operating said printing instrumentalities, a plurality of switching contacts, means for operating said contacts in correspondence with the operation of said selector elements, means controlled by said selector elements for conditioning said contact operating means to be operated, and means controlled by said selector controlled means for restraining said printing instrumentality operating means from operating.

9. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing instrumentalities under the control of said selector elements, a plurality of switching contacts under the control of said selector elements, normally effective means for operating said printing instrumentalities, normally disabled means for operating said switching contacts, means controlled by said selector elements for conditioning said contact operating means to be operated, and means operable concurrently with the conditioning of said contact operating means for disabling said printing instrumentality operating means.

10. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing instrumentalities individually selectable by said selector elements, means for operating said printing instrumentalities, a plurality of switching contacts, means for operating said contacts in correspondence with the operation of said selector elements, a switching mechanism controlled by said switching contacts, means controlled by said selector elements for conditioning said contact operating means to be operated, means controlled by said selector controlled means for restraining said printing instrumentality operating means from operating, and means controlled by said restraining means for conditioning said switching mechanism to be operated by said switching contacts.

11. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing instrumentalities individually selectable by said selector elements, means for operating said printing instrumentalities, a plurality of electrical contacts, means for operating said contacts in correspondence with the operation of said selector elements, a normally disabled selector mechanism controlled by said contacts, means controlled by said selector elements for conditioning said contact operating means to be operated, means controlled by said selector controlled means for restraining said printing instrumentality operating means from operating, and means controlled by said restraining means for

conditioning said selector mechanism to be controlled by said contacts.

12. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of printing members individually selectable by said selector elements, means for operating said printing members following the selection thereof, electrical contact means individual to said selector elements to be operated according to the setting of said selector elements, means for operating said electrical contact means, means for disabling said printing member operating means and for conditioning said electrical contact operating means to be activated, and switching means controlled by said electrical contact means.

13. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing members following the selection of their associated selectable elements, electrical contact means individual to and to be operated in accordance with the setting of said selector elements, means controlled by one of said selectable elements for disabling said printing member operating means, and means also controlled by said one selectable element for operating said electrical contact means.

14. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing members individually selectable by said selector elements, means for operating said printing members upon selection thereof, a plurality of electrical contacts adapted to be operated in accordance with the setting of said selector elements, normally disabled means for operating said electrical contacts, means controlled by said selector elements for conditioning said contact operating means to be operated, means for retaining said contact operating means in operative condition, means for disabling said printing member operating means, and means also controlled by said selector elements for releasing said retaining means to disable said contact operating means.

15. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing member following the selection of the selectable elements associated therewith, a plurality of electrical contacts to be operated in accordance with the setting of said selector elements, normally disabled means for operating said electrical contacts, means controlled by one of said selectable elements for conditioning said contact operating means to be operated, means also controlled by said one selectable element for disabling said printing member operating means, means for retaining said electrical contact operating means in operative condition, and means controlled by another of said selectable elements for releasing said retaining means to disable said electrical contact operating means.

16. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing elements following the selection of their

associated selectable elements, means controlled by a selectable element having no printing member associated therewith for withholding said printing members operating means from operating, and means for retaining said withholding means operated.

17. In a telegraph receiver, a set of selector elements responsive to telegraph signals, a plurality of selectable elements individually selectable by said selector elements, a plurality of printing members individually associated with certain of said selectable elements, means for operating said printing members following the selection of their associated selectable elements, means controlled by a selectable element having no printing member associated therewith for withholding said printing member operating means from operating, means for retaining said withholding means operated, and means controlled by another selectable element having no printing member associated therewith for releasing said retaining means.

18. In a printing telegraph receiver, a plurality of individually selectable printing members, normally unoperated permissively operable means for operating said printing members upon selection thereof, means operable positively irrespective of the instantaneous condition of said printing member operating means for preparing to latch said printing member operating means in its normal position, and latching means yieldably associated with said positively operable means for accommodating return of said printing member operating means to normal position and for thereupon latching said printing member operating means.

19. In a printing telegraph receiver, a reciprocable operating member, power actuated means for engaging and actuating said reciprocable means, selectable means for placing said reciprocable means in motion receiving relation to said power actuated means, and latching means for said reciprocable member pivoted to follow said member during the reciprocation thereof and remain in latching relation thereto.

20. In a printing telegraph receiver, a reciproca-

ble operating member, power actuated means for reciprocating said member, selectable means for placing said reciprocable member in motion receiving relation to said power operated means, latching means for said reciprocable member pivoted to follow said reciprocable member and retain it in motion receiving relation to said power operated means, and selectable means for disengaging said latching means from said reciprocable member.

21. In a printing telegraph receiver, a reciprocable operating member, power operated means for operating said member, selectable means for placing said reciprocable member in motion receiving relation to said power operated means, latching means for said reciprocable member pivoted to follow said member and retain it in motion receiving relation to said power operated means, and selectable means for withholding said latching means from following said member whereby to effect disengagement of said member from said latching means.

22. In a printing telegraph receiver, a set of selector elements responsive to received signals, a plurality of printing instrumentalities individually selectable by said selector elements, means for operating said printing instrumentalities, a plurality of switching contacts, means for operating said contacts in correspondence with the operation of said selector elements, a switching mechanism controlled by said switching contacts comprising a plurality of relays having their armatures and contacts arranged in a fan circuit, means controlled by said selector elements for restraining said printing instrumentality operating means from operating, means controlled by said restraining means for connecting an operating source of potential for said relays to said contacts, means also controlled by said selector elements for conditioning said contact operating means to be operated, and means controlled by said contact operating means following the operation of said contacts for electrically energizing a path through said fan circuit.

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