Aug. 4, 1942. S. W. ROTHERMEL 2,291,759

TELEGRAPH APPARATUS

Filed July 13, 1940 2 Sheets-Sheet 1

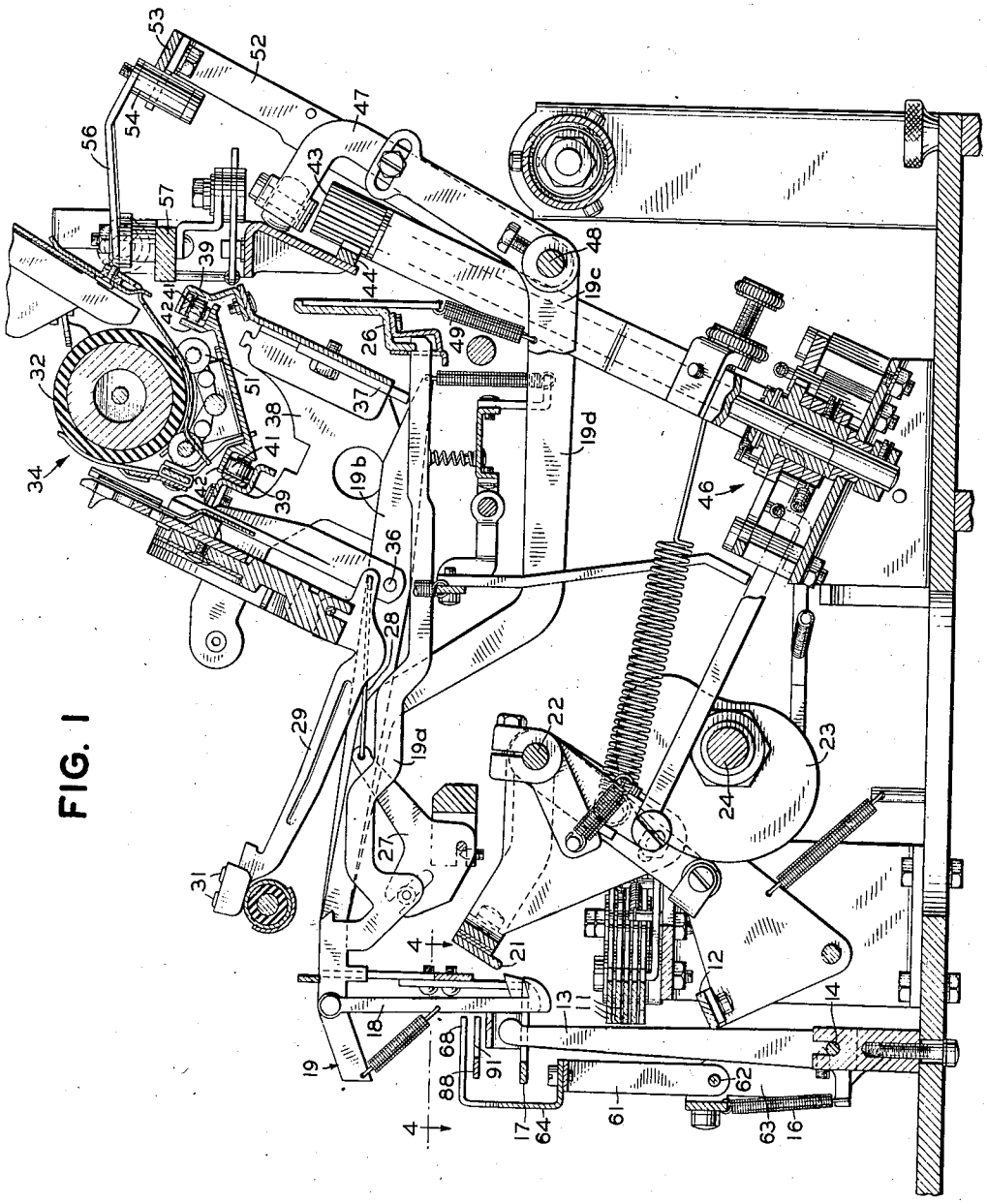


FIG. 1

INVENTOR
S. W. ROTHERMEL

BY M. R. Marsh

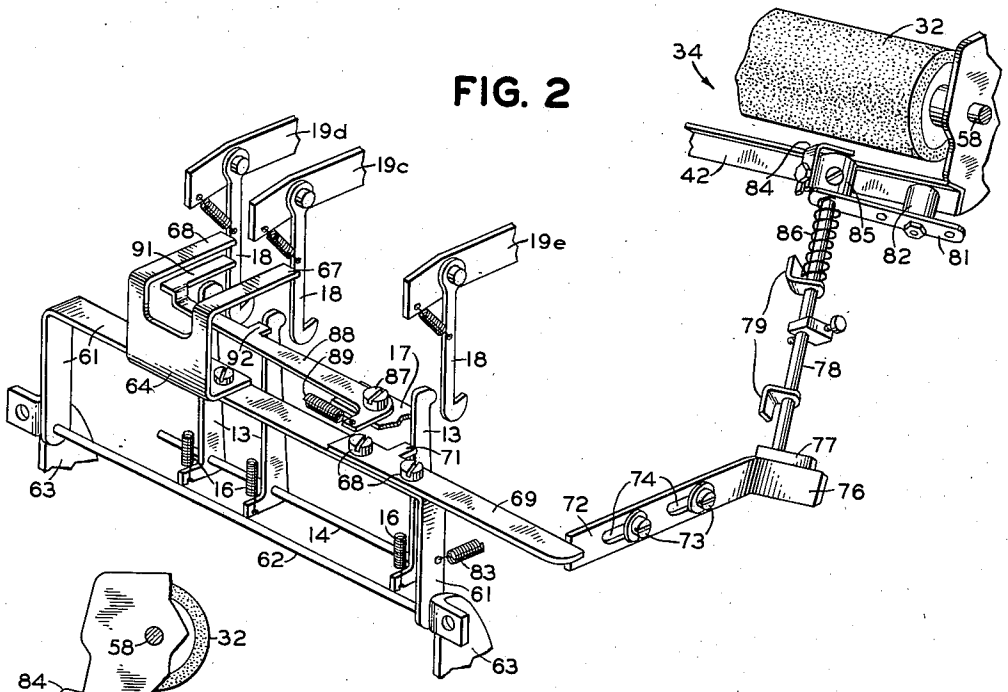
ATTORNEY

Aug. 4, 1942. S. W. ROTHERMEL 2,291,759

TELEGRAPH APPARATUS

Filed July 13, 1940 2 Sheets-Sheet 2

FIG. 2



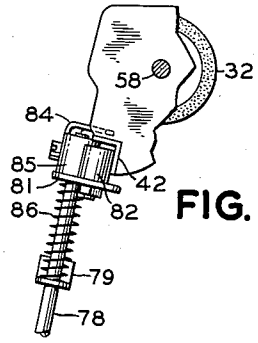
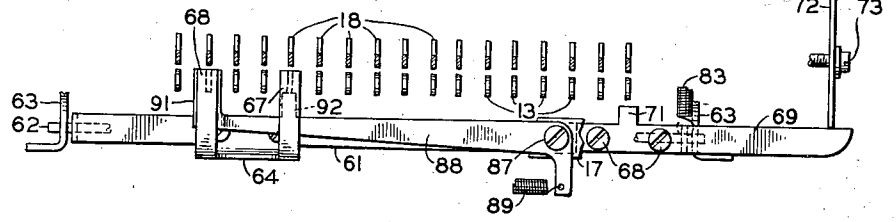


FIG. 3

FIG. 4



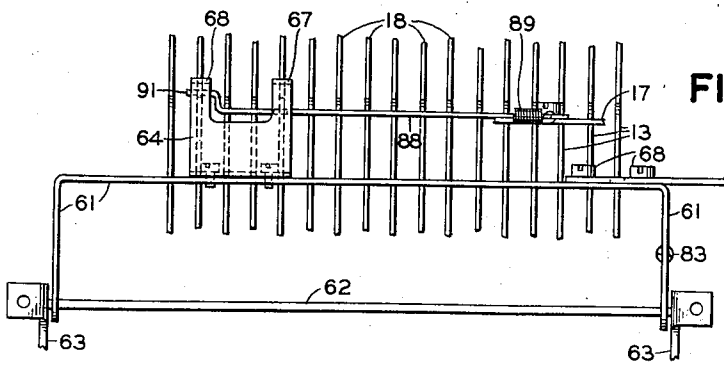


FIG. 5

INVENTOR
S. W. ROTHERMEL
BY M. R. Marsh
ATTORNEY

Patented Aug. 4, 1942 2,291,759

UNITED STATES PATENT OFFICE

2,291,759

TELEGRAPH APPARATUS

Samuel W. Rothermel, Lynbrook, N. Y., assignor to The Western Union Telegraph Company, New York, N. Y., a corporation of New York

Application July 13, 1940, Serial No. 345,305

6 Claims. (Cl. 178—27)

The present invention relates primarily to printing telegraph apparatus and more particularly to apparatus for enabling certain functions of a telegraph printing machine, such as line feeding and carriage return functions, to be performed automatically when predetermined conditions exist at the telegraph receiver.

There are two general types of printing telegraph receivers employed, the two types being known as page printers and tape printers. The tape printer, as the name implies, being one wherein the signals are recorded in printed form on a tape of rather narrow width, and the page printer being one wherein recording occurs in transverse lines of a recording paper of substantial width. Obviously in a page printer the printing unit has to be moved relative to the recording paper after each line of print, and the recording paper advanced to present a clean or fresh surface to the printing unit. These line feeding and carriage return functions of page printers are usually performed in response to associated signals and obviously line time is consumed during the transmission of such signals. While both of the above general types of printers have their advantages, one type may be preferred for obvious reasons in one class of service over the other type.

Sometimes both types of printers are employed on the same circuit, and although a tape printer may work satisfactorily in response to signals transmitted primarily for a page printer, wherein there are line feed and carriage return signals, the page printer will not operate satisfactorily on signals transmitted primarily for a tape printer or signals wherein line feed and carriage return signals are absent.

Accordingly, it is one of the primary objects of the present invention to provide an attachment for telegraph printers of the page type, wherein certain of the functions thereof, such as the line feed and carriage return functions, are performed automatically without the necessity of transmitting representative function signals.

It normally requires an appreciable length of time to perform a carriage return and/or line feed function, usually about that required to record one character and where the carriage return and line feed functions are performed automatically, it is desirous that they occur during a non-printing function of the receiver, such as during a word space function, so as not to lose a character. It is also desirous that where the line feeding and carriage returning functions occur automatically that they occur only at or near the end of a line.

Accordingly, another object of the invention is to provide a device for automatically performing a line feeding and carriage returning function in a page printer only after the printing unit has moved relative to the recording paper to within a predetermined distance from the end of a line and to perform the said functions in response to or concomitantly with a non-printing function signal.

Another object of the invention is to automatically perform functions such as the line feeding and carriage returning functions in an interval of time not greater than that required to perform an ordinary printing function.

Obviously in page printers a carriage return function is invariably accompanied by a line feed function, as otherwise printing would occur two or more times on the same line, whereas it is often desirous to perform a line feeding function without performing a carriage return function.

It is, therefore, another object of the invention to provide an arrangement whereby a line feeding function is invariably performed concomitantly with a carriage return function in response to a carriage return signal while permitting a line feed function to be performed in response to a line feed signal independently of the carriage return function.

Still further objects of the invention reside in its reliability, minimum number of parts required, cheapness of manufacture, and ease of attaching to page printers already available of the type such as that disclosed in a copending application of P. A. Noxon et al., Serial No. 66,906, filed March 3, 1936.

The above and other objects of the invention will be more apparent hereinafter when taken in conjunction with the accompanying drawings, wherein only the elements of the printer above identified that cooperate with the elements of the invention or those of the printer deemed necessary for a complete and thorough understanding of the invention are shown, and while the preferred embodiment of the invention is arranged and hereinafter described and shown in the drawings as being applied to a page printer of the above type, it will be obvious that the principles thereof are applicable to various other types of page printers.

In the drawings:

Fig. 1 is a vertical sectional view taken substantially through the center of a printer of

the above type and showing the manner in which certain of the elements of the invention cooperate with the elements of the printer;

Fig. 2 is a perspective view of the invention showing the cooperation thereof with certain of the elements of the printer;

Fig. 3 is an elevational view of the movable carriage and the cooperating elements of the invention;

Fig. 4 is a horizontal sectional view taken substantially on line 4—4 of Fig. 1; and

Fig. 5 is a front elevational view showing the manner in which the elements of the invention are attached to the printer and the cooperation thereof with the elements of the printer.

Referring first to Fig. 1, a brief description of some of the elements employed in the control of a printer of the above type will be briefly described. Horizontally mounted at the front of the printer is a set of five longitudinally movable permutation bars 11. There is a permutation bar for each variable impulse of the character code and they are set in left and right hand positions corresponding to the received character codes in conjunction with the operation of a selector mechanism (not shown). The permutation bars 11 have arranged on the front sides thereof a series of notches with the notch in each bar being arranged differently from those in each of the others and for each combination of settings of the permutation bars a notch in each is in vertical alignment with a notch in each of the others. Following the setting of the permutation bars 11 a cyclically operable bail member 12 is operated to permit a series of drop-in bars 13 to approach the permutation bars. The drop-in bars 13 are disposed in a vertical position, being pivoted at 14 adjacent their lower ends with individually attached springs 16 tending to pivot the same in a clockwise direction as shown in Fig. 1. As the bail 12 permits the drop-in bars 13 to pivot toward the permutation bars 11, the one opposite the aligned row of notches therein is permitted to pivot a slight amount further than the rest of the drop-in bars which are stopped in their clockwise pivoting by engaging the projections of the permutation bars forming the notches.

A horizontal comb plate 17 guides the drop-in bars adjacent the upper ends thereof and also serves to guide the lower ends of pivoted hooks 18, the hooks 18 being pivoted at their upper ends to associated operating levers indicated in general by reference numeral 19. Each of the drop-in bars 13 has an associated hook 18 and when a drop-in bar is selected by entering a row of notches in the permutation bars 11, it pivots its associated hook 18 underneath a cyclically operable operating bail 21. The bail 21 pivots about a rod 22 and is controlled from an operating cam 23 rotated through one revolution in conjunction with each received code group of impulses from an operating shaft 24.

As hereinbefore stated, each hook 18 has an associated operating lever 19 and each operating lever is adapted to perform an associated function. The print operating levers, such as 19a, are pivoted adjacent the rear or right hand ends on a plate 26 and through bell cranks and links, such as 27 and 28, respectively, are arranged to pivot type bars such as 29 so that the type elements 31 on the free end of the latter engage the printing platen 32 on which is carried the recording paper to effect recording thereon.

The above type of printer employs a platen carriage carrying a cylindrical platen 32 and the recording paper. The carriage is movable to and fro relative to the printing mechanism to advance the paper from one character to the next or word space and to return the paper for the beginning of a new line of print. In addition to the to and fro movement of the carriage, the carriage being indicated in general by reference numeral 34, it moves up and down in a plane inclined slightly from the vertical to present the center of the platen to either one or the other of the two type elements 31 on the type bars 29. The carriage is raised and lowered in response to shift and unshift signals, respectively. A shift lever 19b with a hook 18 at the left hand end thereof is pivoted adjacent the center at 36 and has the right hand end engageable with a plate 37 attached to a bracket 38 forming a part of the platen carriage cradle. The selection of the hook 18 on the shift lever 19b or the movement thereof beneath the operating bail 21 in response to a shift signal causes the latter to pivot in a counter-clockwise direction when the operating bail 21 functions. The shift lever 19b in pivoting engages the plate 37 to elevate the cradle and carriage whereupon the same are latched in their elevated position. The selection of another hook 18 in response to an unshift signal through an operating lever (not shown) releases the cradle allowing the same to return to its normal lowered position.

The cradle includes a set of horizontal tracks or guides such as 39 which cooperating with rollers 41 and other tracks such as 42 forming a part of the carriage guide the latter in its to and fro movement.

The carriage 34 is biased in the direction of the beginning of a new line of print by the usual carriage return spring and is mechanically advanced concomitantly with the printing of each character against the action of the carriage return means. The carriage advancing mechanism includes a pinion 43 engageable with a rack 44 carried by the carriage, the pinion being rotated or stepped a predetermined amount for each printing function by a carriage advancing mechanism indicated in general by reference numeral 46. To effect the return of the carriage 34 for the beginning of a new line of print, the rack 44, which is pivotally carried by the carriage, is pivoted out of engagement with the pinion 43 whereupon the resilient carriage returning means is effective to return the carriage. The pivoting of the rack 44 from out of engagement with the pinion 43 is effected by a lever 47 attached to the right hand end of a so-called carriage return operating lever 19c pivotally mounted on a rod 48. The left hand end of the carriage return operating lever is not shown but is of similar construction to that of a line feed operating lever 19d hereinafter described. A spring such as 49 attached to the carriage return operating lever 19c normally holds the same in an unoperated position and when a hook 18 at the left hand end is selectively pivoted beneath the operating bail 21, the levers 19c and 47 operate to effect disengagement of the rack and pinion 44 and 43, respectively. Thereupon the carriage return spring returns the carriage 34 to its initial position with the left hand margin of the recording paper opposite the center of the printer or at the point at which the type bars 29 strike.

The recording paper is held in frictional engagement with the periphery of the platen 32 by spring pressed rollers such as 51 and to effect

advancement of the paper the platen 32 is rotated. The elements for rotating the platen 32 include the line feed operating lever 19d which is pivoted on the rod 48 and has attached to the right hand arm thereof a lever 52. The lever 52 has at its upper end a horizontally extending bail 53 which in all positions of the carriage is in operative relation with a roller 54 carried on one end of a bell crank 56. The bell crank 56 is pivotally mounted on a section 57 of the carriage frame and has on the opposite end thereof a pawl in operative relation with a ratchet fixed to the platen shaft 58. The pawl and ratchet are not shown for the sake of simplicity in the drawings, their construction being similar to that used in most typewriters. The selection of the hook 18 at the left hand end of the line feed operating lever 19d by the hook being pivoted beneath the operating bail 21 causes the line feed operating lever to be pivoted in a counter-clockwise direction when the bail 21 operates. The lever 52 pivoting with the line feed operating lever 19d moves the bail 53 toward the left and it engaging the roller 54 pivots the bell crank 56 to operate the attached pawl and rotate the platen 32. The fact that the bail 53 is engageable with the roller 54 in any position of the carriage 34 permits the platen 32 to be rotated with the carriage in any of its positions. A spring similar to the spring 49 attached to the carriage return perating lever 19c is attached to the line feed operating lever 19d and normally maintains this lever with its attached members in their normal position or returns the same thereto following the operation thereof.

One of the operating levers, such as 19e, Fig. 2, has no type bars such as 29 or other operating or function levers attached thereto and the operation of the lever 19e by the selection of its associated hook 18 only advances the platen carriage such as for spacing between words.

The above described elements comprise more or less standard elements in a printer of the well-known type, and the following paragraphs will be devoted to the cooperation of these elements with those of the invention along with the description of the new elements.

In accordance with the invention, an inverted U-shaped bail 61, Figs. 1, 2, 4 and 5, is mounted on a rod 62 supported in the upper end of elements 63 of the printer. Attached to the upper side of the bail 61 is a bracket member 64 which has two fingers 66 and 67 extending horizontally therefrom. The bracket 64 is so positioned on the bail 61 that the finger 66 is in alignment with the hook 18 on the line feed operating lever 19d, and the finger 67 in alignment with the hook 18 on the carriage return operating lever 19c. In the normal position of the bail 61 there is a slight clearance between the ends of the fingers 66 and 67 and the associated hooks 18. At the right hand end of the bail 61, attached thereto by screws 68, is an arm 69, the arm having extending from the rear edge thereof a projection 71 in alignment with the drop-in bar 13 associated with the hook 18 on the word space operating lever 19e.

The free end of the arm 69 cooperates with the left hand end of a bar 72. The bar 72 is mounted in a substantially horizontal position and is adapted for longitudinal movement by means of screws 73 extending through slots 74 therein. The right hand end of the bar 72 has a foot 76 which cooperates with an arm 77 fixed to the lower end of a rod 78. The rod 78 is supported in brackets 79 extending from the frame of the printer and has secured to the upper end thereof an arm 81. The arm 81 pivots with the rod 78 in a manner hereinafter described and has adjacent the free end thereof a roller 82 in operative relation with the track 42 forming a part of the carriage 34.

With the carriage 34 in a position such as that shown in Figs. 2 and 3 or such that the roller 82 engages the track 42, the rod 78 is pivoted so that the arm 77 engages the foot 76 to hold the bar 72 in its left hand position. With the bar 72 in its left hand position, the left hand end engages the arm 69 to hold the bail 61 in its normal position against the action of an attached spring 83. When the bail 61 is in its normal position, the fingers 66 and 67, and the projection 71 are out of engagement with the associated hooks 18 and the drop-in bar 13, respectively. After the carriage 34 travels a predetermined distance from the beginning of a line, the track 42 moves out of engagement with the roller 82 whereupon the left hand end of the bar 72 is no longer effective to block inward movement of the arm 69. Thereupon the arm 69 and the bail 61 pivot a slight amount to bring the projection 71 on the arm 69 against the drop-in bar 13 associated with the word space operating lever 19e.

As pointed out above in the description of the printer, a drop-in bar 13 is permitted to pivot an amount sufficient to place its associated hook beneath the operating bail only when a row of notches exists in the permutation bars 11 opposite the particular drop-in bar. Accordingly, after the carriage 34 has advanced sufficiently to move the track 42 past the roller 82, the next word space signal operates the permutation bars 11 to set up a row of notches therein opposite the drop-in bar 13 associated with the word space operating bar 19e. As the said word space drop-in bar 13, with the carriage 34 near the end of a line, is the blocking means for the bail 61, the entrance of this drop-in bar into a row of aligned notches allows the bail 61 to pivot therewith. This pivoting of the bail 61 moves the fingers 66 and 67 of the brackets 64 into engagement with the hooks 18 on the levers 19d and 19c, respectively, to place the said hooks together with the hook 18 on the word space operating lever 19e beneath the operating bail 21. Therefore, as the operating bail 21 subsequently operates the line feed operating lever 19d, the carriage return operating lever 19c and the word space operating lever 19e are simultaneously operated. The operation of the line feed operating lever 19d causes the rotation of the printing platen 32 to advance the recording paper or perform a line feeding operation, while the carriage return operating lever through the elements hereinbefore described pivots the rack 44, Fig. 1, out of engagement with the pinion 43 to effect a carriage return function. The operation of the word space operating lever 19e simultaneously with the carriage return operating lever 19c has no effect on the carriage as at the time the word space operating mechanism is operated the rack 44 is out of engagement with the pinion 43. Hence, the selection of the word space drop-in bar 13 following the advancement of the carriage to within a predetermined distance of the end of a line automatically effects carriage return and line feed functions. As the automatic carriage return and line feed functions occur in response to a word space signal, no characters are lost. Until the carriage 34 has been advanced sufficiently to

disengage the track 42 from the roller 82, the pivoting of the bail 61 is prevented by the bar 72 and hence the receipt of a word space signal does not initiate an automatic line feed and carriage return function until near the end of a line.

During the return of the carriage 34 for the beginning of a new line of print, the track 42 reengages the roller 82 to pivot the rod 78 a slight amount in a clockwise direction as viewed from the upper end thereof, whereupon the arm 77 cams the bar 72 toward the left. The bar 72 engaging the arm 69 on the bail 61 pivots the latter back into its normal position. By changing the position of the roller 82 on the arm 81 the point in the travel of the carriage at which the track 42 allows the rod 78 to pivot can be changed. Thus, the distance from the end of the line at which a word space is effective to automatically perform carriage return and line feed functions may be varied.

In order that the track 42 be prevented from moving out of operative relation with the roller 82 in response to a shift signal, an angle bracket 84 movable with the rod 78 engages the upper side of the track 42 to cause the rod to move in an upward direction when the carriage 34 so moves. A spring 86 coiled about the rod 78 assists in the upward movement of the rod 78, while the upper surface of a collar 85 on the upper end of the rod 78 engaging the under side of the track pushes the rod down as the carriage moves down in response to an unshift signal. The width of the arm 77 at the lower end of the rod 78 is such that a section thereof is in operative relation with the foot 76 on the bar 72 regardless of the upper or lower position of the rod 78. Hence a word space signal is effective to effect line feed and carriage return functions in either the shift or unshift positions of the carriage after the latter has moved to within a predetermined distance from the end of a line.

Pivotally mounted by a shoulder screw 87 in the comb plate 17 is a bell crank 88, Fig. 2. The bell crank 88 has a spring 89 attached to one arm thereof, while a finger 91 at the free end of the other arm is disposed beneath the finger 66 on the bracket 64 in operative relation with the hook 18 on the line feed operating lever 19*d*. A second finger 92 on the bell crank 88 is in operative engagement with the drop-in bar 13 associated with the carriage return operating lever 19*c*. The spring 89 tends to pivot the bell crank 88 so that the finger 92 follows the carriage return drop-in bar 13 when the latter is selected in response to a carriage return signal. The selection of the carriage return drop-in bar thus allows the bell crank 88 to pivot and in pivoting the finger 91 on the bell crank places the hook 18 of the line feed operating lever 19*d* beneath the operating pawl 21. Thus, whenever a carriage return function is performed in response to a carriage return signal, a line feed function is automatically performed. However, the selection of the line feed drop-in bar 13 does not allow the bell crank 88 to pivot, and hence only a line feed operation or function is performed in response to a line feed signal.

It is obvious, of course, that various modifications of the invention shown and described herein may be made without departing from the spirit or essential attributes thereof, and it is desired, therefore, that only such limitation be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

What is claimed is:

1. In a telegraph apparatus, a platen movable to and fro relative to a printing mechanism, a selector mechanism comprising a set of notched permutation members selectively positioned in accordance with received code combinations, a plurality of pivotable members selectively controlled by said permutation members, a single operating bail for performing all printing an all auxiliary functions of said apparatus, a plurality of hooks selectively pivotable into the path of said bail by associated of said pivotable members, said hooks having a one-way operating connection with associated pivotable members, means operable by the operation of a predetermined one of said pivotable members in pivoting its associated hook into the path of said bail for pivoting others of said hooks into the path of said bail and means determined by the position of said platen in said to and fro movement for controlling said last-mentioned means.

2. In a telegraph printer, a platen carriage movable to and fro to effect letter spacing and the return thereof for the beginning of a new line of print, a plurality of operating levers, an operating bail for performing all printing and all auxiliary functions of said printer, individual hook members associated with each of said levers and normally out of the path of said operating bail, selectively controlled means for placing said hooks one at a time beneath said operating bail and means controlled by the operation of a predetermined one of said selectively controlled members and dependent upon the to and fro movement of said carriage for placing a plurality of said hook members beneath said operating bail.

3. In a telegraph printer, a platen carriage movable from one shift position to another and movable to and fro in a direction at right angles to said shift movement to effect word spacing and the return thereof for the beginning of a new line of print, a plurality of operating levers, a plurality of hooks associated therewith, an operating bail, selector controlled means for placing said hooks one at a time beneath said bail and means cooperating with said carriage in the to and fro movement independently of the shift positions thereof and with said selector controlled means for placing of a plurality of said hooks beneath said bail to operate a plurality of said operating levers.

4. In a printing telegraph machine, a to and fro movable platen carriage, a set of permutation members, a first set of pivotable members selectively controlled for operation one at a time by said permutation members, a second set of pivotable members one individual to each of said first set of pivotable members and normally operated thereby, means operating with a predetermined one of said first pivotable members for operating a plurality of said second pivotable members independently of associated first pivotable members and means cooperating with said platen carriage and dependent upon the to and fro position thereof for controlling the operation of said last-mentioned means.

5. In a printing telegraph machine, a to and fro movable platen carriage, a set of permutation members, a first set of pivotable members selectively controlled for operation one at a time by said permutation members, a second set of pivotable members one individual to each of said first set of pivotable members and normally operated thereby, a first means controlled by the

to and fro movement of said platen carriage, a second means controlled by a predetermined one of said first pivotable members and means including said first and second means for simultaneously operating a plurality of said second pivotable members.

6. In a printing telegraph machine, a set of permutation members, a set of primary pivotable members selectively controlled for operation one at a time by said pivotable members, a set of secondary pivotable members one individual to each of said primary pivotable members and normally operated thereby, means controlled by a predetermined one of said primary pivotable members for operating its associated secondary pivotable member and the secondary pivotable member associated with a second predetermined one of said primary pivotable members, and means including the means controlled by the predetermined one of said primary pivotable members for operating said second secondary pivotable members independently of its associated primary pivotable member.

SAMUEL W. ROTHERMEL.