Feb. 16, 1954 R. D. SALMON ET AL 2,669,602

PRINTING TELEGRAPH APPARATUS

Filed Aug. 29, 1952 2 Sheets-Sheet 1

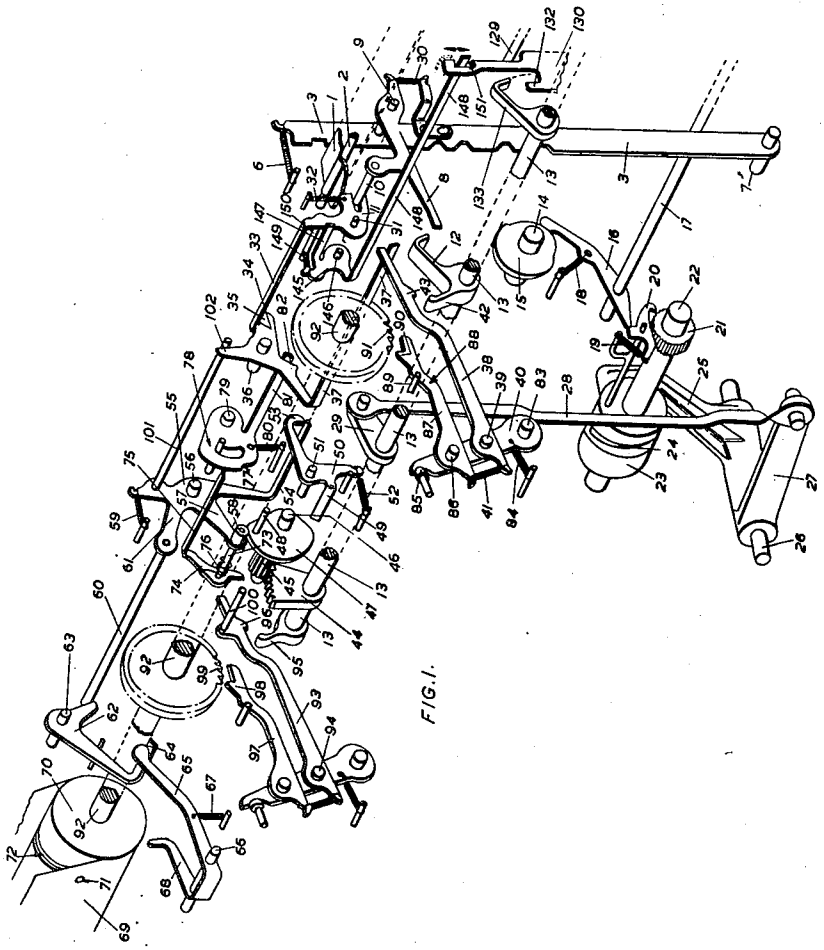

FIG. 1.

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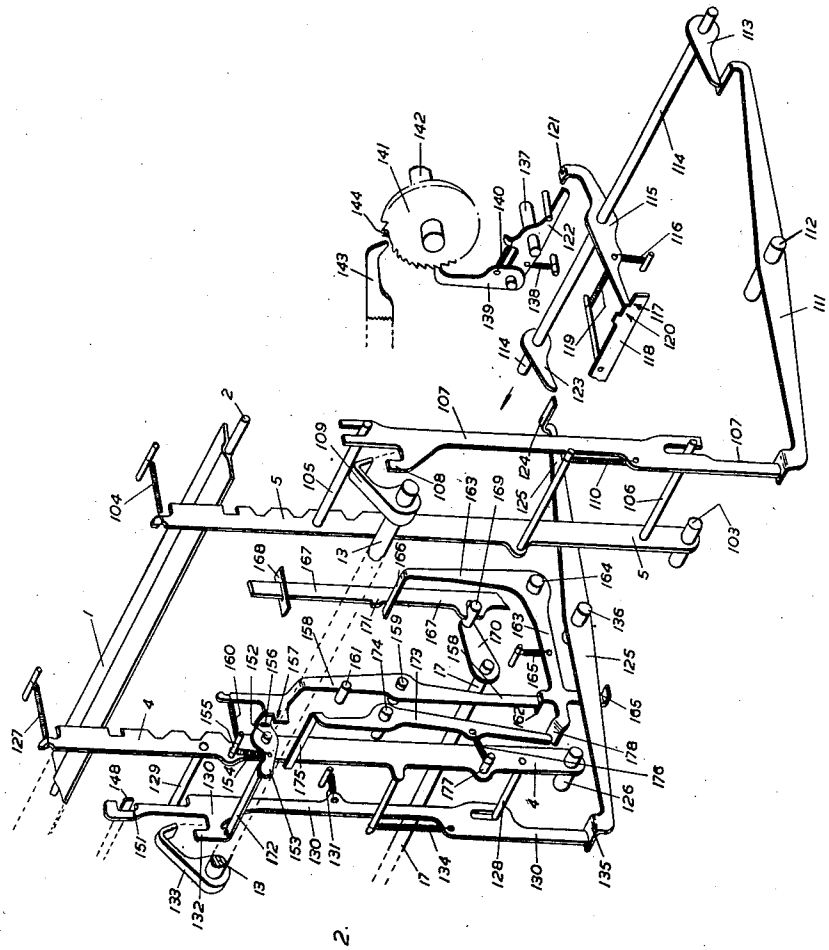

FIG. 2.

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UNITED STATES PATENT OFFICE

2,669,602

PRINTING TELEGRAPH APPARATUS

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Application August 29, 1952, Serial No. 306,984

Claims priority, application Great Britain September 27, 1951

5 Claims. (Cl. 178—2)

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This invention relates to printing telegraph apparatus and in particular to a page printing telegraph receiver incorporating an "answer back" mechanism which is released in response to the receipt of a distinctive "who are you" signal combination to transmit the characteristic code number of the apparatus or of the station at which the apparatus is situated.

In the specification of British Patent No. 644,850 there is described apparatus for automatically positioning the paper in a page printing telegraph receiver so that printing of a received message will commence at a predetermined position on the paper, usually at the top of a new form. This apparatus is brought into operation on the receipt of a "form feed" signal combination. In the arrangements described in this prior specification, in order to be effective at the receiver, this form feed signal combination is immediately preceded by a "secondary shift" signal combination which makes available a number of facilities not provided in the normal lower and upper cases associated respectively with "letters" and "figures."

Where both form feed and answer-back facilities are provided, it is clearly desirable that the form feed opertion be completed and the paper fed into its final position before the answer-back transmitter is released.

According to the present invention there is provided page printing telegraph apparatus comprising means operative in response to one or more distinctive signals of the first kind to move the paper into a predetermined position, means normally operative in response to a distinctive signal of a second kind to release an answer-back transmitter and means operative when said second distinctive signal is received after said first distinctive signal and before the paper has been moved into its predetermined position to delay the release of said answer-back transmitter until the paper has been moved into said position.

An embodiment of the invention as applied to a printing telegraph receiver is shown divided between Figs. 1 and 2 of the accompanying drawings. It is to be understood that the only parts of the receiver which have been shown are those material to the present invention. Other parts such as the supporting framework have been omitted in the interests of clarity. That part of the mechanism which is shown in Fig. 1 is mainly concerned with providing the form-feed facility while that shown in Fig. 2 is mainly concerned with the release of the answer-back transmitter.

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Certain items interconnecting the two parts of the mechanism have been duplicated so as to appear in both figures.

It will be assumed that in the embodiment to be described, the invention is applied to a page-printing telegraph receiver of the type disclosed in British patent specification No. 620,682. In this type of telegraph receiver, the successively received code element of a signal combination are caused to set five storage members (assuming a five-unit code to be in operation) under the joint control of the receiving magnet and a selector cam sleeve released for rotation by the response of the magnet to the start element of the received signal combination. The selector cam sleeve during its rotation releases a translator cam sleeve for rotation and a cam on this translator cam sleeve causes the settings of the five storage members to be transferred to a first set of five permutation members in the form of notched discs co-operating with radially disposed bell crank levers and a second set of five permutation members in the form of tiltable vanes co-operating with notched function levers. The first set of permutation members acts in well known manner to select a character to be printed while the second set acts to select a desired function to be performed.

In the accompanying drawings only one tiltable vane is shown (partly broken away) at 1 mounted on a spindle 2 and co-operating with three notched function levers, namely the "Form Feed" lever 3 (Fig. 1) the "Answer Back" lever 4 (Fig. 2) and the "Figure Shift" lever 5 (Fig. 2). The remainder of the signal selector and translator mechanism has been omitted since it forms no part of the present invention.

The operation of the mechanism shown in Fig. 1 on receipt of a form feed signal combination will first be described.

Reception of a form feed signal combination following the secondary shift signal combination causes the tiltable vanes such as 1 to take up a combinational setting which permits a spring 6 to rotate the form feed function lever 3 anticlockwise through a small arc about its pivot 7. This movement of lever 3 causes a leftward movement of a horizontal lever 8 pivotally attached at 9 to the form feed lever. Lever 8 is guided by a projecting pin 10 sliding in a slot in one arm of a bell crank lever 11 at present held stationary. This movement of lever 3 brings its left hand extremity into the path of a bail 12 fixed to a reciprocable shaft 13 (shown fragmentarily).

As soon as the form feed function lever 3 has

been selected as above described under the control of a cam (not shown) on the translator cam sleeve (shown diagrammatically at 14), another cam 15 on the same cam sleeve acts on a detent 16 to rotate the latter clockwise together with its spindle 17 thus extending spring 18. This allows another spring 19 to draw a pawl 20 into the teeth of a ratchet wheel 21 fixed to a continuously rotating shaft 22. The pawl 20 is pivotally attached to the function cam sleeve 23 which is thereby caused to rotate with shaft 22. The arrangements just described constitute in fact a conventional type of friction clutch such as is commonly to be found in printing telegraph apparatus. The function cam sleeve 23 is provided with a cam-shaped recess 24 in which rests one end of a lever 25 freely mounted on a shaft 26. Fixed to lever 25 is a second lever 27 also freely mounted on shaft 26 and connected by a link 28 to a lever 29 fixed to shaft 13 carrying bail 12. The cam recess 24 is so shaped that for each revolution of cam sleeve 23, lever 25 is reciprocated once and imparts a like reciprocatory movement to shaft 13 via members 27, 28 and 29.

The first movement of bail 12 is in a clockwise direction and as it rotates it presses down the left-hand end of lever 8 causing the latter to pivot about the point 9 against the pull of a spring 30. At the same time pin 10 projecting from lever 8 causes bell crank lever 11 to rotate clockwise about its pivot 31 against the pull of a spring 32. The upper arm of bell crank lever 11 is bent over and extended to form a horizontal latching lever 33 normally engaging step 34 formed in a three armed lever 35 pivoted at 36. One arm of lever 35 is provided with an extension 37 supporting one end of a lever 38 pivotally attached at 39 to a lever 40 at present stationary. As soon as three-armed lever 35 is unlatched by arm 33, a spring 41 rotates lever 38 in a clockwise direction about pivot 39 until it comes into contact with a vertical bail 42 integral with horizontal bail 12 on shaft 13. At the instant this occurs shaft 13 is nearing the end of its clockwise rotation and the point of contact between lever 38 and bail 42 is just to the right of projection 43 formed from lever 38. As lever 38 rotates clockwise it depresses extension 37 of three-armed lever 35 causing the latter to rotate clockwise about pivot 36 so that the step 35 is brought above the level of latching lever 33.

Also fixed to shaft 13 is a segmental rack 44 meshing with a pinion 45 fixed to a short shaft 46 carrying a cam 47. The first half-revolution of cam sleeve 23 causes cam 47 to rotate through 180° in an anticlockwise direction at the end of which a pin 48 projecting from the face of the cam strikes an arm 49 formed from a bell crank lever 50. This causes lever 50 to rotate by a small amount about its pivot 51 thus extending a spring 52 and bringing a hooked end 53 clear of an arm 54 extended from a four-armed lever 55 pivoted at 56. Another arm 57 of lever 50 carries a roller 58 as soon as arm 54 is freed from hooked end 53, a spring 59 rotates lever 55 anticlockwise about pivot 56 to bring roller 58 into contact with the periphery of cam 47.

All the events so far described take place before or during the first half-revolution of cam sleeve 23 and the clockwise rotation of shaft 13. As the cam sleeve begins its second half-revolution, cam 47 begins to rotate back in a clockwise direction from its 180° position. As it does so, spring 59 causes roller 58 to follow cam 47, the contour of which is such as to cause lever 55 to be rotated anti-clockwise about pivot 56. A rod 60 projecting from an arm 61 of lever 55 acts on a bell crank lever 62 to rotate it clockwise about its pivot 63 and an extension 64 of lever 62 rotates another lever 65 about its pivot 66 against the pull of a spring 67. Integral with lever 65 is a seeker 68 which is thereby brought into contact with the paper 69 wrapped around the platen 70.

As explained in said British Patent No. 644,850 the paper 69 is provided with a hole 71 so located that it will be opposite the point of the seeker 68 when the paper is in the correct position for printing to commence. The platen 70 is provided with a circumferential groove 72 in the same plane as the hole 71. In describing the present embodiment it will first be assumed that the seeker 68 does in fact find a hole in the paper 69 denoting that the paper is in the right position. This hole would not then of course be in the position indicated at 71 but would be impossible to show in its correct position in Fig. 1.

Half way through the second half revolution of cam 47, i. e. when cam sleeve 23 has turned through 270°, roller 58 comes onto the lowest point of the periphery of cam 47 and the tip of seeker 68 passes right through the hole in the paper into the groove 72. Attached to arm 57 carrying roller 58 is a short shaft 73 on which is pivoted a lever 74 having a horizontal extension 75. At this moment—i. e. when lever 55 is in its extreme anticlockwise position—a spring 76 rotates lever 74 to bring extension 75 under a step 77 formed in the edge of a plate 78 pivoted at 79.

Continued rotation of cam 47 (from 270° to 360°) causes four-armed lever 55 to be rotated clockwise about pivot 56 to bring seeker 68 out of the hole in the paper 71. At the same time extension 75 engaging step 77 in plate 78 causes the latter to rotate clockwise about its pivot 79 against the pull of a spring 80. An extension 81 of plate 78 engages under a back edge 82 of three-armed lever 35 so that the latter is rotated clockwise about its pivot 36. Extension 37 of lever 35 rotates lever 38 anticlockwise about its pivot 39 thus extending spring 41 and bringing projection 43 out of the path of vertical bail 42.

During the return (anti-clockwise) stroke of vertical bail 42 its companion horizontal bail 12 allows spring 30 to rotate lever 8 about pivot 9 in a clockwise direction. Pin 10 causes lever 11 to rotate in the opposite direction about pivot 31 so bringing the end of latching lever 33 above, but clear of, step 34 on lever 35.

As cam sleeve 23 completes its revolution and shaft 13 completes its return movement, hooked end 53 of bell crank lever 50 engages once more the horizontal arm 54 formed from lever 55.

By the time that the function cam sleeve 23 approaches the end of its revolution the translator cam sleeve 14 has been arrested by means not shown but well known in the art. Thus cam 15 has returned to its initial position and detent 16 is again in the path of pawl 20 attached to function cam sleeve 23. As the latter completes its revolution, detent 16 withdraws pawl 20 from the teeth of ratchet wheel 21 fixed to the continuously rotating shaft 22. Thus the function cam sleeve is arrested at the end of one revolution. It is to be noted that the function cam sleeve 23 is similarly allowed to make just one revolution for each signal combination received (not only the form feed signal combination) with

the exception of the answer back signal combination which may in certain circumstances cause it to make a plurality of revolutions as will be explained later.

It will now be assumed that when the seeker 68 is first presented to the paper 69 on the platen 70, the paper is not in its correct initial position and the seeker finds no hole therein. The immediate result of this is that the seeker is unable to rotate fully about its pivot 66 and similarly four-armed plate 55 is unable to rotate sufficiently to allow horizontal extension 75 to engage under step 77 in plate 78. Thus when lever 55 is again rotated clockwise during the last part of the first revolution of cam sleeve 23, plate 78 does not move from the position shown. This in turn means that three-armed lever 35 is left in its extreme anti-clockwise position and projection 43 on lever 38 is left in the path of the vertical bail 42. As the latter returns in an anti-clockwise direction to its initial position it comes into contact with projection 43 which is, however, so shaped as to allow the bail to slide over it when moving in this direction.

During the return (anti-clockwise) stroke of vertical bail 42 its companion horizontal bail 12 acts, as previously described, to allow spring 30 to rotate lever 8 clockwise about pivot 9. Since, however, three-armed plate 35 is still in its extreme anti-clockwise position, levers 8 and 11 can only rotate until the end of latching lever 33 comes into contact with lever 35 below the step 34. No further action takes place until the function cam sleeve 23 approaches the end of its revolution.

It has already been explained that each received signal combination (except sometimes the answer back) causes the function cam sleeve 23 to make one revolution and then to be arrested. Although in the revolution which follows the receipt of the form feed signal combination it is established whether the paper is in the right position or not, at least one further revolution of this cam sleeve is required to perform a form feeding operation should such prove to be necessary. These further revolutions of the function cam sleeve 23 may conveniently be brought about by the reception of repeated form feed signal combinations. Thus the operator at the transmitter either depresses the form feed key lever a plurality of times or else depresses the form feed key lever simultaneously with the "run out" key lever, thus causing the form feed signal combination to be sent automatically a plurality of times. In either event the result at the receiver will be the same, namely that the detent 16 will be held out of the path of the pawl 20 each time the latter completes a revolution.

Assuming then that the seeker 68 finds no hole in the paper on platen 70 and that the function cam sleeve 23 continues to rotate, the vertical bail 42 is again rotated clockwise and comes into contact with projection 43 on lever 38, which lever is still in its extreme anti-clockwise position. As bail 42 continues to rotate it remains in contact with projection 43 and pulls lever 38 to the right. This in turn rotates lever 40 clockwise about its pivot 33 against the pull of a spring 84, normally acting to keep the upper end of the lever against a stop 85. Pivotally attached at 86 to lever 40 is a form feed pawl 87 provided with a cam surface 88 is held in contact with a fixed pin 89 by spring 41. As lever 38 is moved to the right by vertical bail 42, pawl 87 is similarly moved to

the right and the shape of cam surface 88 is such that spring 41 is permitted to rotate pawl 87 anti-clockwise by a small amount about its pivot 36 so bringing pawl tooth 90 into engagement with one of the teeth on a ratchet wheel 91 fixed to the platen spindle 92 carrying the platen 70.

Continued clockwise rotation of vertical bail 42 during the first half of the second revolution of the function cam sleeve 23 causes feed pawl 87 to rotate ratchet wheel 91 in an anticlockwise direction by an amount sufficient to advance the paper 69 on platen 70 by the space of one line of printing.

During the second half of the second revolution of cam sleeve 23 the seeker 68 is operated as previously described to ascertain whether or not the paper 69 is now in the correct position.

If the paper is in the correct position then lever 38 is lifted clear of vertical bail 42 as previously described and continued reciprocation of the bail has no further effect on the feed pawl 87.

If the paper is not in the correct position, the platen continues to be rotated, one step at a time for each revolution of cam sleeve 23. As soon as the seeker enters the hole 71 in the paper, form feeding is suspended in the manner previously described.

In order that the form feed mechanism shall be ready to function the next time a form feed signal combination is received, the mechanism must be reset into the condition shown in Fig. 1. In particular, it is necessary to disengage extension 75 of lever 74 from step 77 in plate 78. This is achieved on the receipt of the first line feed signal combination.

Receipt of the line feed signal combination causes the selection by the tiltable vanes (such as 1) of the line feed function lever (not shown). At the same time the form feed function lever 3 is pushed out into its unselected position if it has not already been pushed out on receipt of a previous signal combination. When the line feed function lever is selected it acts through mechanism (not shown) to allow a lever 93 pivoted at 94 to fall onto a bail 95 fixed to shaft 13. There is a revolution of cam sleeve 23 associated with the receipt of the line feed signal combination and so bail 95 is first rotated clockwise and then anticlockwise in the same way as bails 12 and 42. As bail 95 rotates clockwise it engages a projection 96 on the lever 93 and thereby moves lever 93 in the same way as lever 87 was moved by bail 42. The line feed pawl 97 is linked with lever 93 in the same manner as the form feed pawl 87 is linked with lever 38. The continued clockwise rotation of bail 95 causes the line feed pawl tooth 98 first to engage one of the teeth in a ratchet wheel 99 fixed to platen spindle 92 and thereafter to rotate the platen 70 by an amount sufficient to feed the paper 69 thereon by the space of one line of printing. Just before the completion of the clockwise rotation of bail 95 a pin 100 projecting from lever 93 strikes lever 74 and rotates it anticlockwise by a small amount about pivot 73. This brings extension 75 of lever 74 clear of step 77 in plate 78 and the latter is brought back to its initial position by spring 80. This in turn allows three-armed lever 35 to rotate anticlockwise about pivot 36 until step 34 comes once again into contact with latching lever 33. During its return stroke (anti-clockwise) bail 95 merely rides over projection 96 on lever 93.

Although the seeker cam 47 is reciprocated for every received signal combination, the seeker 68 is only required to operate when a form feed condition has been set up. To this end, a rod 101 projects from the uppermost arm 102 of three-armed lever 35. Only if lever 35 is in its anti-clockwise position which only occurs when a form feed signal combination has been received is four-armed lever 55 free to be rotated anti-clockwise by spring 59 and so to present the seeker to the paper on the platen.

The operation of the answer back mechanism will now be described with particular reference to Fig. 2.

The answer back mechanism is prepared for operation by the receipt of the "Figure Shift" signal combination and released for operation (in normal circumstances) by the subsequent receipt of the "who are you" signal combination.

The receipt of the figure shift signal combination causes the vanes such as 1 to assume a combinational setting which permits the figure shift function lever 5 to be selected by being rotated clockwise about its pivot 103 under the pull of a spring 104. The figure shift function lever 5 carries two projecting pins 105 and 106 on which is slidably mounted a detent member 107 lying parallel to the function lever and as the latter moves into selected position, the member 107 is similarly rotated clockwise about a point near its lower extremity. This brings an extension 108 of member 107 into the path of a bail 109 fixed to shaft 13. The receipt of the figure shift signal combination causes shaft 13 to be reciprocated as previously described and as it rotates initially clockwise, bail 109 acts on extension 108 to press member 107 downwards against the pull of a spring 110. This movement of member 107 acts through a rocking lever 111, pivoted at 112, to rotate clockwise a lever 113 fixed to a shaft 114 journalled in the frame of the machine. Also fixed to shaft 114 is another lever 115 which is normally held down by a spring 116 onto a lower step 117 formed in a member 118 forming part of the stationary framework. As lever 113 rotates clockwise it lifts the end of lever 115 clear of step 117 and allows a spring 119 to draw lever 115 and shaft 114 bodily in the direction of the arrow until the end of lever 115 comes onto an upper step 120 formed in member 118. The effect of this longitudinal movement of the shaft 114 and lever 115 is twofold, namely:

(*a*) It positions the turned over end 121 of lever 115 just above the end of the answer-back pawl lever 112, and

(*b*) It positions the free end of a lever 123—also fixed to shaft 114—just above the turned over end 124 of the answer back release lever 125.

When the who-are-you signal combination is received the vanes such as 1 take up a combinational setting which permits the answer-back function lever 4 to be selected by being rotated clockwise about its pivot 126 under the pull of a spring 127. At the same time, the figure shift function lever 5 is rotated anti-clockwise into its unselected position if it has not already been rejected by the receipt of an intervening signal combination. The answer back function lever 4 carries two projecting pins 128 and 129. On pin 128 is slidably mounted the lower end of a detent member 130 while a spring 131 urges the upper end of member 130 to follow pin 129. As function lever 4 moves clockwise into selected position, member 130 is similarly rotated clockwise about a point near its lower extremity. This brings an extension 132 of member 130 into the path of a bail 133 fixed to shaft 13. (The last mentioned items appear in both figures of the drawing.)

The receipt of the who-are-you signal combination causes shaft 13 to be reciprocated as previously described and as it rotates initially clockwise, bail 133 acts on extension 132 to press member 130 downwards against the pull of a spring 134 (Fig. 2). Member 130 acts on a turned-over end portion 135 of the answer back release lever 125 to rotate the latter anti-clockwise about its pivot 136 so causing turned-over end 124 to rotate lever 123 (previously positioned above end 124 in the manner already described) clockwise together with its shaft 114. This in turn causes lever 115 to rotate clockwise so that its turned-over end 121 rotates pawl lever 122 clockwise about its pivot 137 against the pull of a spring 138. A pawl 139 pivoted on lever 122 and connected therewith by a spring 140 engages a tooth of a ratchet wheel 141 fixed to a shaft 142 carrying the answer-back drum (not shown) and as pawl lever 122 rotates clockwise, pawl 139 advances ratchet wheel 141 by the space of one tooth (in a clockwise direction).

The answer-back drum is of well known construction, being provided with a plurality of wards or teeth cut to correspond to the characteristic code combinations of the station to be identified. These co-operate with the final set of permutation members in the transmitter mechanism of the teleprinter. Also co-operating with ratchet wheel 141 is a feed pawl 143 (shown in part) which is reciprocated once in every revolution of the transmitter cam sleeve (not shown). Pawl 143 is arranged to advance the drum one tooth at a time thereby causing the answer-back code combinations to be sent out one by one in the correct sequence. In its initial position, ratchet wheel 141 is provided with a cutaway portion 144 in lieu of one tooth. Thus in normal transmission, reciprocation of pawl 143 under the control of the transmitter cam sleeve produces no effect on the ratchet wheel 141.

When pawl 139 advances ratchet wheel 141 by the space of one tooth in response to the receipt of the who-are-you signal combination the feed pawl 143 is permitted to engage the tooth immediately behind the cutaway portion 144. At the same time, the transmitter cam sleeve is set in rotation (by means not shown) and thus pawl 143 is reciprocated to advance the ratchet wheel and the answer back drum one step at a time until all the combinations on the drum have been transmitted. Thereafter the pawl 143 comes again into the cutaway portion 144 and the transmitter cam sleeve is arrested.

Also controlled by the transmitter cam sleeve is mechanism (not shown) which resets shaft 114 together with its levers 113, 115 and 123 into their initial positions as shown in Fig. 2. This mechanism and the actual answer back drum mechanism have been omitted as they do not constitute any part of the present invention and their presence would add to the complexity of the drawing.

With the mechanism so far described it is necessary for the operator to ensure that he has sent a sufficient number of form feed signal combinations to position the paper at the receiver

correctly before he depresses his "who-are-you" key lever.

According to the present invention, however, it is only necessary for the operator to send the secondary shift, form feed, figure shift and "who-are-you" combinations as a group of four signals whereupon steps are automatically taken at the receiver to ensure that the paper is in its correct position before the answer-back drum is released.

In carrying out this embodiment of the invention additional mechanism is involved which will be introduced as it becomes necessary in the ensuing description.

It has already been explained that upon receipt of the form feed signal combination (following the secondary shift combination) the form feed function lever 3 (Fig. 1) moves into selected position and initiates a cycle of events during which the seeker 68 is presented to the paper 69 on the platen 70 to ascertain whether or not the paper is in the required position for the commencement of a message. If the seeker finds no hole, showing that the paper is not in its correct position, the mechanism is left in a condition where every subsequently received signal combination will cause a successive line feed operation to take place until the correct position of the paper is reached. In this condition of the mechanism of Fig. 1, lever 11 is in its extreme clockwise position and will remain there until the seeker finds a hole and form feeding is suspended. Co-operating with lever 11 is a lever 145 pivoted at 146 and having two turned over extensions 147 and 148. A spring 149 anchored to a pin 150 projecting from lever 11 urges extension 147 of lever 145 into contact with lever 11 and so causes lever 145 to move in sympathy with lever 11. Thus when lever 11 is rotated clockwise into its operated position at the beginning of the form-feed cycle, lever 145 is similarly rotated clockwise about its pivot 146. This brings the right hand end of extension 148 into the position shown dotted in Fig. 1. Normally this end of extension 148 is in front of a cutaway portion 151 in the upper end of the answer back detent member 130 so that the latter is free to follow the answer back function lever 4 as it moves into selected position. In its dotted position, however, the end of extension 148 of lever 146 acts as a blocking member to prevent the detent member from following the answer-back function lever although it does not prevent the latter from moving into its selected position.

It will now be assumed that the form feed signal combination is immediately followed by the letter shift and who-are-you combinations and that several further revolutions of the function cam sleeve 23 are necessary before the form feeding operation may be said to be completed.

When the figure shift combination is received, the form feed function lever 3 is rejected but it is to be noted that the form-feed condition having been once established persists until the paper 69 has been fed to its correct position. Thus not only is lever 38 left in a position to co-operate with pawl 42 to perform successive line feeds but blocking member 148 is left in the path of the answer back release lever 130.

When the figure shift combination is received the function cam sleeve is released for one revolution and this causes the paper on the platen to be fed forward one line. The receipt of the figure shift combination also causes the answer-back trip mechanism to be prepared in the manner already described.

When the "who-are-you" signal combination is received the form feed condition is still set up and the resulting revolution of the function cam sleeve causes the paper on the platen to be fed forward another line. The seeker establishes that the form feed condition must be maintained for the present and consequently extension 148 of lever 145 is in a position to prevent detent member 130 from following the answer-back function lever 4 as the latter moves into its selected position. Until detent member 130 is allowed to follow function lever 4 and the answer-back drum cannot be released.

Since it is assumed that the platen 70 must be further rotated in order to bring the paper 69 into correct position before the answer-back drum is released, it will be apparent that arrangements must be provided to prevent the function cam sleeve 23 from being arrested after it has completed the two revolutions associated respectively with the figure shift and "who-are-you" combinations. Pivotally mounted at 152 on the answer-back function lever 4 (Fig. 2) is a short lever 153. A spring 154 anchored to pin 155 on lever 4 tends to keep a turned over end 156 on top of a step 157 formed in a lever 158 pivoted at 159. A further spring 160 also anchored to pin 155 resiliently connects levers 4 and 158.

As the answer-back function lever 4 moves into selected position, lever 153 pushes lever 158 so that the latter rotates clockwise about pivot 159 and away from its stop 161. This movement of lever 158 brings its lower extremity off an upper extension 162 of a bell crank lever 163 pivoted at 164. A spring 165 anchored in the machine is thus permitted to rotate lever 163 clockwise about pivot 163 until a lower extension 165 formed from the horizontal arm of lever 163 comes into contact with the underside of the answer-back release lever 125. At the same time a horizontal extension 166 of the vertical arm of bell crank lever 163 is brought into close proximity with a vertical member 167. This member 167 is arranged to slide vertically in two guides, only one of which has been shown at 168, and is formed with a slot in which slides a pin 169 projecting from a lever 170 fixed to shaft 17.

Referring to Fig. 1 it will be remembered that upon receipt of any signal combination the translator cam sleeve 14 is released for one revolution and a cam 15 thereon rotates detent 16 clockwise together with its shaft 17 and thereby allows the ratchet clutch of the function cam sleeve to be engaged for one revolution. Subsequently in normal operation the detent is returned to its former position so that it can disengage the function cam sleeve at the end of its revolution.

In the present circumstances, when detent 16 is rotated clockwise it acts through shaft 17 and lever 170 (Fig. 2) to slide member 167 into a lower position. A projection 171 on member 167 is so shaped as to cam extension 166 of lever 163 out of its downward path but once member 167 has reached its lower position spring 165 brings extension 166 onto the upper edge of projection 171. When spring 18 (Fig. 1) attempts to replace the detent 16 in the path of the pawl 20 driving the function cam sleeve 23, member 167 tries to rise but the shape of projection 171 prevents it from passing extension 166 in this direction. Thus detent 16 is held out of the path of pawl 20 and the function cam sleeve 23 continues to rotate until the paper on platen 70 has been fed

to its correct position, the position of the paper being tested once during each revolution by the seeker 68.

When the seeker finds a hole in the paper form feeding operation is suspended as previously described, and the lever 11 (Fig. 1) is replaced in its original position. This brings extension 148 back in front of cutaway portion 151 in detent member 130 thus allowing the latter to be pulled by spring 131 into line with the answer-back lever 4 (Fig. 2) which is still in its selected position. The next downward stroke of bail 133 depresses the detent member 130 thus operating the answer-back release lever 125 and causing the answer-back drum to be released as previously described.

As detent member 130 descends a horizontal extension 172 thereof rotates lever 153 anticlockwise so that end 156 comes off step 157 in lever 158. This permits spring 160 to rotate lever 158 in an anti-clockwise direction by an amount which is limited by the lower end of the lever coming up against the side of upper extension 162 on lever 163. As detent member 130 continues to descend it acts on the lower extension 165 of lever 163 to rotate the latter anticlockwise about its pivot 164. This brings the extension 166 of the vertical arm of lever 163 away from projection 171 on member 167 and thus permits spring 18 (Fig. 1) to replace detent 16 in the path of pawl 20 so as to arrest the function cam sleeve 23 at the end of its present revolution. At the same time, the horizontal arm of lever 163 (Fig. 2) is moved downwards until the upper extension 163 thereof is once again below the lower end of lever 158. This enables spring 160 to rotate lever 158 anticlockwise until its upper end comes into contact with stop 161. In this position, the lower end of lever 158 is again vertically above the upper extension 162 of lever 163 and so as detent member 130 follows the retreating bail 133 upwards, lever 163 is prevented from again rotating clockwise under the pull of spring 165.

When the next signal combination is received the answer back function lever 4 is rotated anticlockwise into its rejected position so extending spring 160 and allowing spring 164 to replace the end 156 of lever 153 on step 157 in lever 158.

With the mechanism so far described, a serious condition is liable to occur if the answer back function lever 4 is rejected for any reason before the form feeding is completed and the answer-back drum released. This would result in the continuous rotation of the function cam sleeve 23 since it is only arranged to be arrested after the detent member 130 has been allowed to follow the answer back function lever into its selected position.

To guard against this contingency a lever 173 is provided pivoted at 174 in the frame of the machine. A horizontal extension 175 of this lever is held in contact with the answer-back function lever 4 by means of a spring 176 anchored to a pin 177 projecting from lever 4. As function lever 4 moves anticlockwise into its rejected position it rotates lever 173 anti-clockwise about its pivot 174 and the lower end of the lever 173 acts on a ramp 178 formed as an extension of the horizontal arm of bell crank lever 163. This in turn causes lever 163 to rotate anti-clockwise and permits it to be locked up once more in a position where it no longer prevents the arrest of the function cam sleeve 23.

While the principles of the invention have been described above in connection with specific embodiments and particular modifications thereof, it is to be clearly understood that this description is made by way of example and not as a limitation on the scope of the invention.

What we claim is:

1. Page printing telegraph apparatus comprising means operative in response to a distinctive signal of a first kind to move the paper into a predetermined position, means normally operative in response to a distinctive signal of a second kind to release an answer-back transmitter and means operative when said second distinctive signal is received after said first distinctive signal and before the paper has been moved into said predetermined position to delay the release of said answer-back transmitter until the paper has been moved into said position.

2. Page printing telegraph apparatus comprising a first function member selectable on receipt of a first distinctive signal to initiate the moving of the paper into a predetermined position, a second function member selectable on receipt of a second distinctive signal, a release member controlled by said second function member, means normally urging said release member to follow said second function member into selected position, means operative when said release member has followed said second function member into selected position to release and answer-back transmitter and means controlled by said first function member for preventing said release member from following said second function member until the paper has been moved into said predetermined position.

3. Page printing telegraph apparatus as claimed in claim 2, further comprising a seeker member, means for moving said seeker member into engagement with the paper and means responsive to said seeker member entering a perforation in said paper to suppress any immediately succeeding line feed operation.

4. Page printing telegraph apparatus as claimed in claim 2, further comprising a blocking member, means operable upon the selection of said first function member to position said blocking member in the path of said release member and means responsive to said seeker member entering a perforation in said paper to remove said blocking member from the path of said release member.

5. Page printing telegraph apparatus as claimed in claim 3, further comprising means responsive to the receipt of said first distinctive signal or signals for moving said seeker member into engagement with said paper to determine whether the paper is in said predetermined position prior to any movement of said paper.

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No references cited.