Oct. 10, 1950 R. D. SALMON 2,524,854

PRINTING TELEGRAPH RECEIVER

Filed Aug. 6, 1947 5 Sheets-Sheet 1

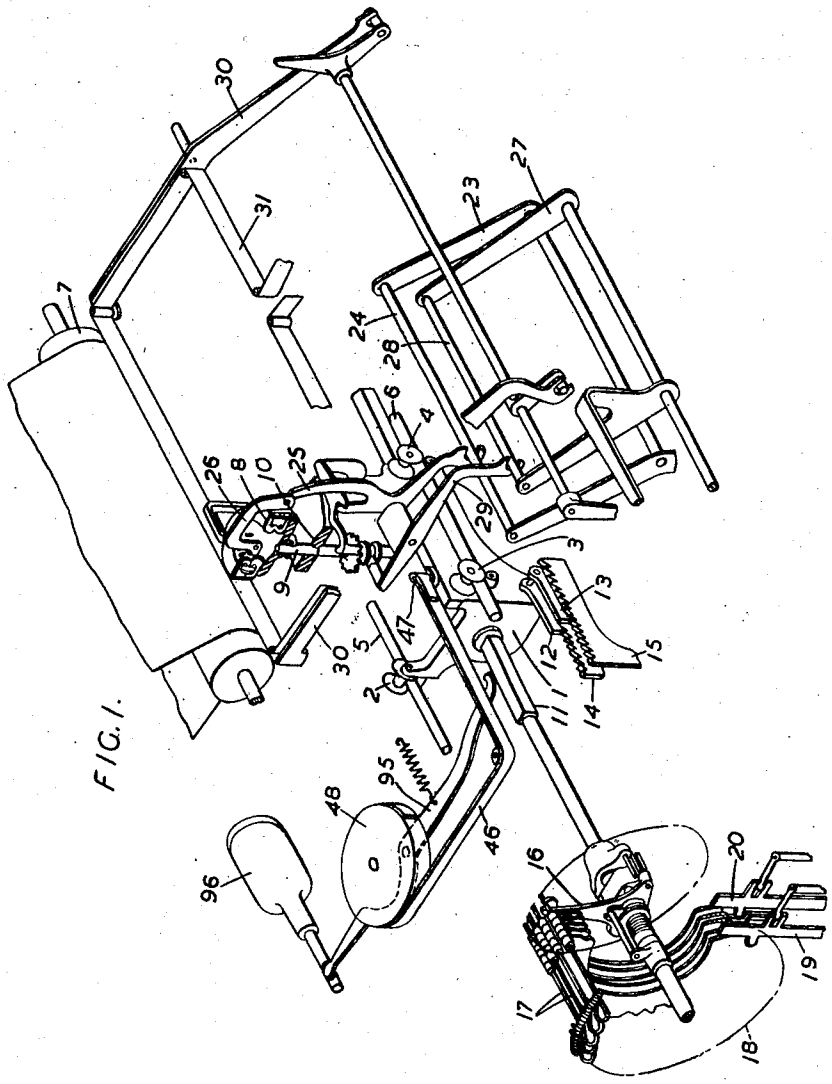


FIG. 1.

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FIG. 4.

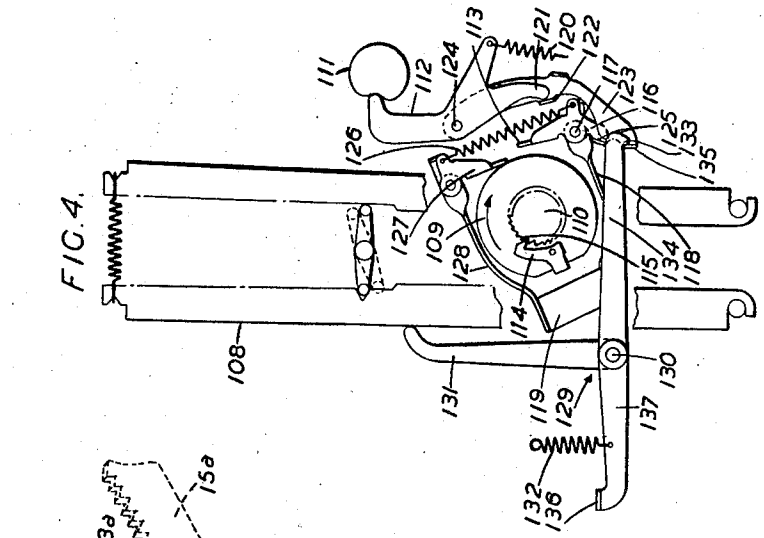
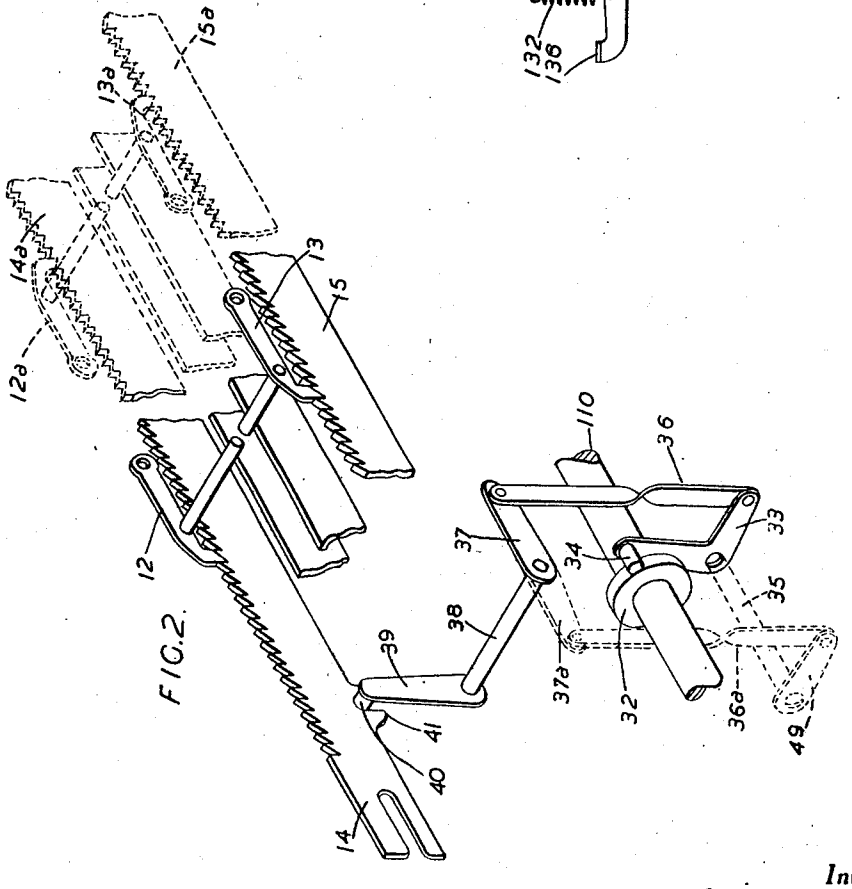


FIG. 2.



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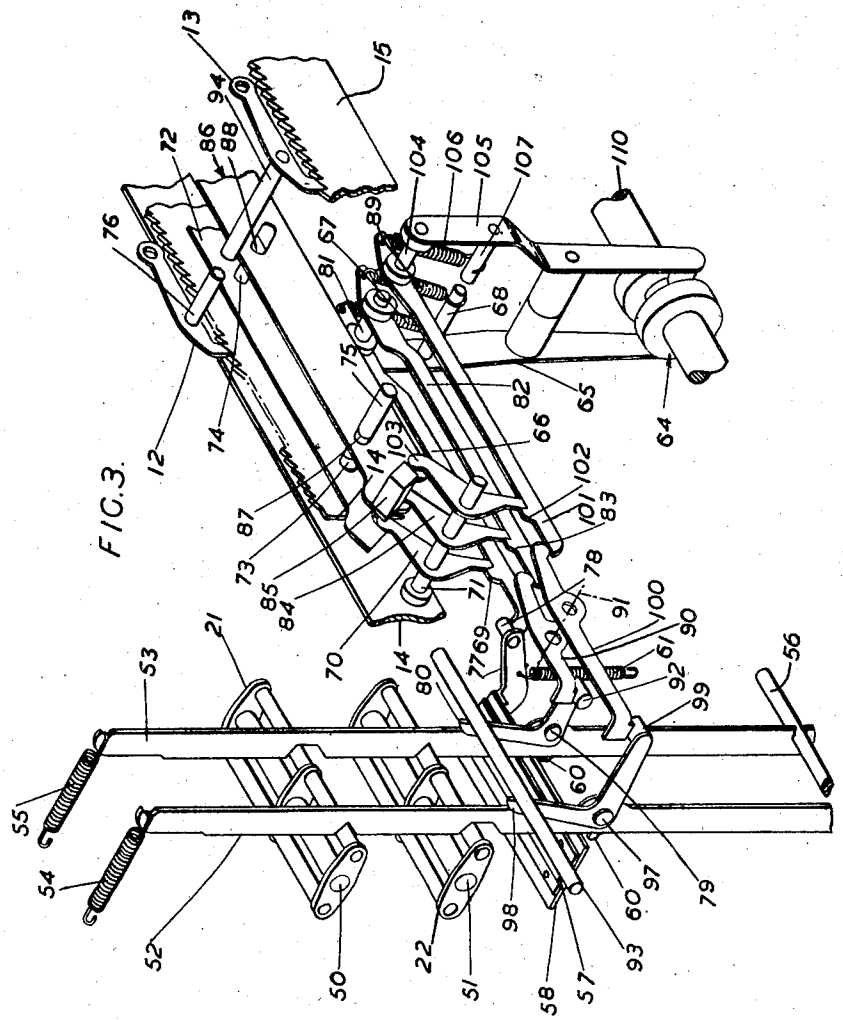


FIG. 3.

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FIG. 6a.

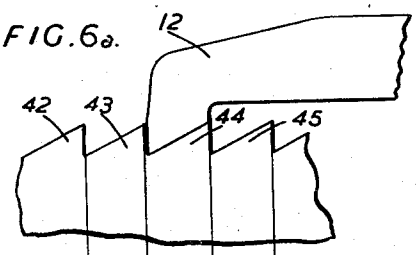


FIG. 6b.

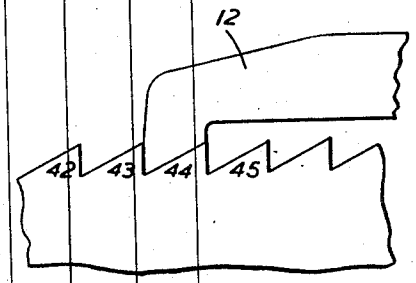


FIG. 6c.

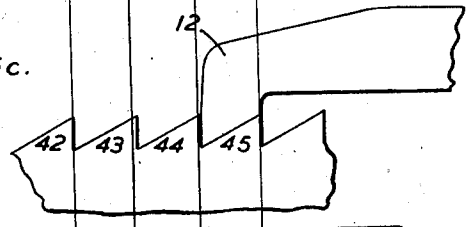


FIG. 6d.

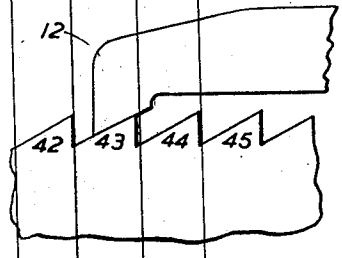
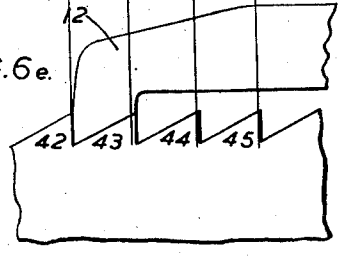


FIG. 6e.



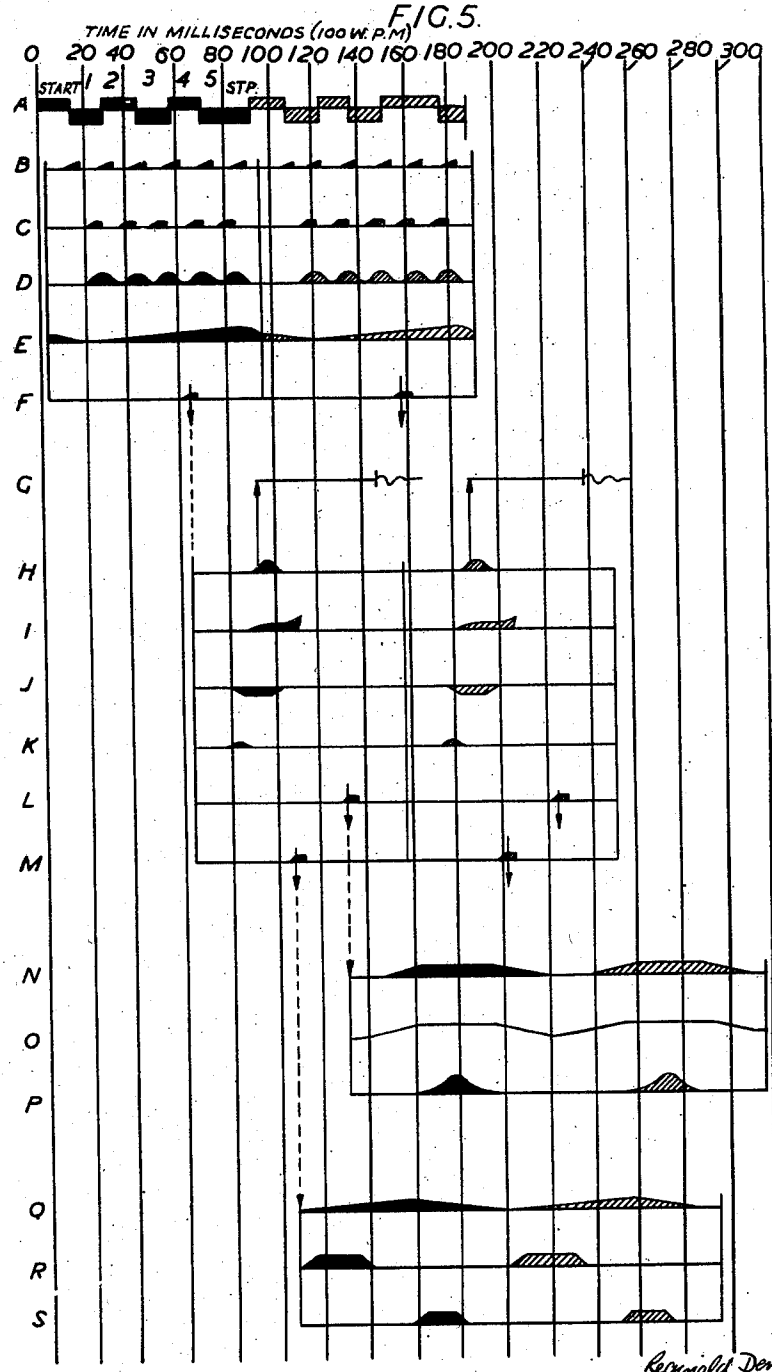
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PRINTING TELEGRAPH RECEIVER

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FIG. 5.



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Patented Oct. 10, 1950 2,524,854

UNITED STATES PATENT OFFICE

2,524,854

PRINTING TELEGRAPH RECEIVER

Reginald Dennis Salmon, Croydon, England, assignor to Creed and Company Limited, Croydon, England

Application August 6, 1947, Serial No. 766,551
In Great Britain May 2, 1946

Section 1, Public Law 690, August 8, 1946
Patent expires May 2, 1966

7 Claims. (Cl. 178—28)

1

This invention relates to page-printing telegraph receivers of the kind in which a type carriage is traversed to and fro parallel to a platen mounted in a stationary part of the framework of the machine. The invention relates more particularly to the arrangements for effecting character spacing of the type carriage.

According to the present invention there is provided a printing telegraph receiver comprising a platen mounted in a stationary part of the framework, a first and a second pawl pivoted on said type carriage and engaging a feeding rack and a retaining rack respectively each of said racks extending parallel to said platen, a function cam sleeve, means for releasing said cam sleeve for rotation in response to each received signal and means for reciprocating said feeding rack endways a distance a little more than one character space movement of said carriage during each rotation of said cam sleeve.

This arrangement is a simple, economical and efficient construction for the purpose of character-spacing and return of the carriage to initial position at the beginning of a line of printing. More-over it is adaptable for many different requirements and allows of various special facilities being provided. For example it enables the machine to be arranged so that the carriage may be traversed during printing either from left to right for the printing of a scrip in Roman characters or by means of a simple modification for printing from right to left as is required in certain oriental scripts such as Arabic. Also the carriage may readily be moved through a number of spaces for tabulating purposes, the carriage may be back spaced through one character space for correction of an error and so on.

The invention will be better understood from the following description of one embodiment taken in conjunction with the accompanying drawings in which:

Fig. 1 is an exploded perspective view showing the type carriage in relation to the platen;

Fig. 2 shows the mechanism for character spacing;

Fig. 3 shows the mechanism for suppressing the spacing movement of the carriage, and for back spacing and for carriage return;

Fig. 4 shows the tabulating arrangement;

Fig. 5 is a timing diagram of the operation of the receiver;

Fig. 6 shows diagrams to aid the explanation of the operations of character spacing and back spacing.

Referring to the drawings, the type carriage 1,

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Fig. 1 is provided with rollers 2, 3, 4 by which it is supported on guide rails 5, 6 for movement parallel to a platen 7 which is journalled for rotation in a stationary part (not shown) of the framework. A typewheel 8 is fixed to a vertical spindle 9 journalled in bearings, one of which is shown at 10 fixed to the carriage 1. The spindle 9 is provided with a squared portion (not shown) which can slide within an internally squared sleeve rotatably mounted on the carriage 1 and driven through bevel gearing in the manner described in U. S. Patent No. 2,382,668, issued to the undersigned, from a spline shaft 11.

Pivotally mounted on the carriage 1 are two pawls, a feed pawl 12 and a retaining pawl 13 which engage with respective racks 14 and 15 extending parallel to the platen 7 over the full extent of the required movement of the carriage 1.

The spline shaft 11 is driven from an electric motor (not shown) through a friction clutch and carries a stop arm 16. This stop arm is arrested to determine the stopping position of the typewheel by one of a number of rods 17 arranged around the circumference of a plurality of notched discs 18.

Each notched disc 18 is rotatable through a small angle in either of two directions according to the kind, whether marking or spacing, of a corresponding code element of the signal. All the discs are moved simultaneously and any rod 17 that is resting in a series of aligned notches in the discs is forced away from the stop arm 16 and the stop arm 16 is rotated by the electric motor and drives the spline shaft 11 which in turn rotates the typewheel 1 until the stop arm 16 is arrested by another rod 17 that has been allowed to be moved by the spring 19 into the path of the stop arm 16 because a series of aligned notches has been presented thereto.

It is convenient at this point to refer to the timing diagram, Fig. 5. The details of the selector mechanism form no part of this invention and thus the parts of this mechanism that perform the operations to which most of the lines of this timing diagram relate have not been shown in the drawings, and only a portion of the translator mechanism is shown in Fig. 3. Nor do the exact timing relations shown in Fig. 5 form any part of the present invention though they assist in understanding the operation of the receiver as a whole.

Line A of Fig. 5 shows a typical received signal. The armature of the receiving magnet, in moving in response to the start element of a signal, releases for rotation through a friction clutch, a

selector cam sleeve, the various cams on which perform operations the timing of which is shown on lines B, C, D, E and F of Fig. 5. Lines B and C need not be further referred to here, nor need line E. Line D shows the operation of a striker member which acts to set in succession five storage members in accordance with the successively received code elements. Line F shows the timing of a cam, which at the instant indicated acts to release for rotation a translator cam sleeve carrying cams, the timing of which is shown in lines H—M of Fig. 5. The selector cam sleeve is arrested at the end of a complete rotation in well known manner and this also applies to the translator cam sleeve and the other cam sleeves referred to hereinafter except when modified in certain circumstances as will be described.

The cam, the timing of which is shown in line H, acts to transfer the setting of the five storage elements to five vertical rods (a five unit code is here assumed) as described in my copending application bearing Serial No. 761,523 filed July 17, 1947. Two of these rods **19**, **20** are shown in Fig. 1. As described in the copending application just referred to, these vertical rods are linked with corresponding discs **18** and also with corresponding code function-selector-members, two of which **21**, **22** are shown in Fig. 3.

The movement of the discs **18** releases as above described the stop arm **16** and with it the typewheel **1** for rotation. The timing of the rotation of the typewheel is shown in line G. The period between the vertical arrow and the short vertical stroke is allowed for rotation of the typewheel, this period being sufficient for a complete rotation, and the period to the right of the short vertical stroke being allowed for the typewheel to oscillate slightly to and fro to take up the shock of the stoppage of rotation.

Lines I, J and K are of no importance here and will not be further described. Line L shows the timing of a cam which releases for rotation a printing cam sleeve, having thereon cams the timing of which is shown in lines N, O and P whilst line M shows the timing of a cam which releases for rotation a function cam sleeve having thereon cams the timing of which is shown in lines Q, R and S. It will be noted that the function cam sleeve is released before the printing cam sleeve.

The cam, the timing of which is shown in line Q effects the character spacing in a manner hereinafter described, whilst the cam, the timing of which is shown in line P operates a printing hammer so that it will be noted that character spacing takes place first followed by printing. The printing cam (line P) operates a frame **23**, Fig. 1 carrying a bail **24**. A lever **25** pivoted on the type carriage **1** engages bail **24** throughout the movement of the carriage along a line of printing. Bail **24** operates lever **25** which in turn operates a printing hammer **26**.

The cam (line N) operates a frame **27** which through a bail **28** and lever **29** raises the typewheel **8** into printing position and lowers it again after operation of the print hammer.

The cam (line O) operates a frame **30** to raise an ink ribbon **31** through the medium of which printing takes place.

The operation of the cams, timing of which is shown in lines R and S will be described hereinafter.

Fig. 2 shows the operation of character spacing of the carriage **1** by means of the cam (line Q of Fig. 5). This last mentioned cam **32**, Fig. 2 operates a bell crank lever **33** through a cam follower roller **34**. Bell crank lever **33** is fixed to a rod **35** journalled in bearings (not shown). One end of a feeding link **36** is attached to the bell crank lever **33** and the other end to a lever **37** fixed to a horizontal shaft **38** journalled for rotation in fixed bearings (not shown). Attached to the shaft **38** is a lever **39** carrying a roller **40** engaging a fork **41** on the underside of the rack **14**.

The cam **32** first rotates the bell crank lever **33** in a clockwise direction and this results in clockwise rotation of levers **37** and **39** to move the feeding rack **14** to the right in Fig. 2. The cam **32** then rotates the bell crank lever in an anti-clockwise direction and the feeding rack **14** is returned to its original position.

The character-spacing operation resulting from this movement will be clear from Fig. 6. Fig. 6 (*a*) shows four teeth **42**, **43**, **44** and **45** of the rack **14** and pawl **12** in engagement with the vertical edge of tooth **43**. The clockwise rotation of bell crank lever **33**, Fig. 2, results in a movement of the rack **14** to a position shown in Fig. 6 (*b*) relative to that in Fig. 6 (*a*) with the pawl **12** remaining in engagement with the vertical edge of tooth **43**. The typewheel carriage is accordingly moved to the right through the distance indicated. When the rack **14** and pawl **12** are in the position shown in Fig. 6 (*a*), the pawl **13** is in engagement with a corresponding tooth on the fixed rack **15** (Fig. 2). During the movement of rack **14** to the position shown in Fig. 6 (*b*) therefore, pawl **12** moves to the right and rides along the sloping edge of a tooth corresponding to tooth **44** Fig. 6 (*a*). It will be noted that the position into which rack **14** has been moved as shown in Fig. 6 (*b*) is a little more than the space of one tooth to the right of the position in Fig. 6 (*a*) so that the pawl **13** drops behind the vertical edge of the tooth on the fixed rack corresponding to tooth **44**.

During the return movement of the rack **14** to its original position shown in Fig. 6 (*c*) the typewheel carriage can only return a small distance to the left until the pawl **13** abuts against the vertical side of the tooth corresponding to tooth **44**, and is there held. During this return movement of rack **14**, therefore, tooth **44** of rack **14** rides under pawl **12** until the latter drops behind the vertical surface of this tooth. The pawl **12** and with it the type-wheel carriage has therefore been moved to the right through the space of one tooth of the rack **14** or the rack **12**, that is, through one character space.

The pawls **12** and **13** are urged into engagement with their corresponding racks **14** and **15** by springs (not shown). As shown in Fig. 1 a steel tape **46** is attached at one end to a post **47** on the carriage **1** and is wound round a spring drum **48** to which the other end is secured. Accordingly the carriage **1** is moved to the right against the force of the spring in the drum **48**.

Fig. 2 shows how the character spacing mechanism is readily modified to cause character spacing to take place from right to left as is required for the Arabic script, for example. The racks **14** and **15** are placed so that the teeth face in the reverse direction, as shown in broken lines at **14***a* and **15***a*, respectively, whilst the pawls **12** and **13** are also reversed into the positions shown in broken lines at **12***a* and **13***a* respectively. The lever **37** is placed in the position shown in broken lines at **37***a* and the link **36**, placed as shown at **36***a* is attached to a lever **49** fixed to the rod **35**.

When bell crank lever **33** is rotated clockwise

by cam 32, lever 49 is rotated clockwise and rotates shaft 38 and lever 39 anti-clockwise, so moving rack 14a to the left.

The mechanism for preventing character spacing taking place when a signal is received (such as a signal representing back space) that does not require a forward character spacing, is shown in Fig. 3.

As described in my said copending application No. 761,523, when the setting of the code discs 18 takes place according to the elements of a received signal, five code function-selector-members, two of which 21 and 22 are shown in Fig. 3 are also set according to the respective code elements. Each of these members is fixed to a horizontal shaft 50, 51 rotatable in fixed bearings (not shown) so that the member 21 or 22 is rotatable into one or other of two positions by this setting action. Co-operating with the code function-selector-members such as 21 and 22 are function levers such as 52, 53 shown in Fig. 3. Each function lever is urged by a spring 54, 55 towards the function-selector-members and for one particular setting of the latter is allowed to move on a pivot rod 56 into selected position. In Fig. 3 both the function levers 52 and 53 are shown, for the sake of clearness of understanding of their respective actions, in selected position, although it is to be understood that only one of theim is permitted to move into selected position at any one time.

Arranged in the same vertical plane as the shafts 50, 51, forming the pivots of the code-function-selector-members 21, 22 is a further horizontal shaft 57 on which is fixed a vane 58. A cam on the translator cam sleeve, the timing of which is shown in line J of Fig. 5 acts once in each revolution momentarily to raise vane 58 into a horizontal position. As will be seen from lines H and J of Fig. 5 the vane 58 Fig. 3 is held in the horizontal position until the code-function-selector-members take up a setting corresponding to the received signal. The particular function lever that is thus selected by this setting determines whether vane 58 shall be held in a horizontal position after it has been released by the cam. Any such function lever corresponding to a function the operation of which does not involve printing, such as the function levers 52, 53 shown in Fig. 3 is either cut with a notch (not shown) or provided with a projection 60 which holds the vane 58 in a horizontal position against the pull of its spring 61. A cam 64 forming part of the function cam sleeve on each revolution reciprocates a lever 65 in a horizontal direction and thereby moves a link 66. Lever 66 is held by spring 67 extended between the end of link 66 and a rod 68 fixed to lever 65 in such position that a latch projection 69 thereon engages a lever 70 pivoted on a rod 71 and thus this lever 70 is rotated by the movements of link 66 about rod 71 in an anti-clockwise direction and thereby raises a bail 72. The bail extends parallel to racks 14 and 15 the full length thereof and is furnished with inclined slots 73 and 74. A fixed guide pin 75 fits in slot 73 and a similar guide pin (not shown) in slot 74. When, therefore, lever 70 is rotated anti-clockwise it engages the bail 72 and moves it upwards on the guide pins in the slots 73 and 74. This bail 72 engages a pin 76 fixed to the feed pawl 12, and raises this feed pawl from engagement with rack 14 before the rack 14 is reciprocated and holds it out of engagement with the rack during such part of the period of the reciprocation as to prevent any character spacing movement of the typewheel carriage. The timing of cam 64 is shown in line R of Fig. 5 and it will be noted that the feed pawl 12 is held out of engagement with the rack 14 until the rack 14 has been moved relatively to the pawl (the carriage 1 and hence rack 14 being held against movement by the pawl 13 being against a tooth of rack 15) to the position shown in Fig. 6 (d) in which position it is free from the tooth 43 with which it was previously in engagement but rests on the sloping edge of that tooth. On the return of rack 14 to original position the rack rides under pawl 12 and the pawl will drop into the same position as before in engagement with the vertical edge of tooth 43. The vane 58 carries an arm 77, having a roller 78 thereon, which engages the end of the link 66. The vane 58 is urged towards clockwise rotation by spring 61. If the vane 58 is held in horizontal position by a function lever such as 52 or 53 the spring 61 is unable to rotate the vane and no spacing action takes place, as above described. If, however, the vane 58 is held in horizontal position by a function lever such as 52 or 53 the spring 61 is unable to rotate the vane and no spacing action takes place, as above described. If, however, the vane 58 is not held by a function lever, the spring 61 rotates it in a clockwise direction. The roller 78 then moves the link 66 about its pivot against spring 67 and so removes the latch 69 from engagement with lever 70. The reciprocation of the link 66 is thus without effect in raising the feed pawl 12 from engagement with rack 14 and on reciprocation of that rack, character spacing movement of the typewheel carriage takes place as above described with reference to Fig. 2.

The return of the typewheel carriage 1 to the beginning of a line of printing takes place when a carriage return signal is received. When this signal is received the five code-function-selector-members such as 21, 22, Fig. 3 are set in such position in accordance with the respective code elements of such signals that a carriage return function lever 53 is pulled by its spring 55 into selected position and rotates through a small arc anti-clockwise about the rod 56. Pivoted at 79 on the lever 53 is a bell crank lever 80 and this bell crank lever, in conjunction with the vane 58 being held in horizontal position by projection 60 on lever 53, effects the carriage-return movement.

In order to understand how this is effected, it is to be noted that pivotally mounted on a pin 81 fixed to lever 65 is a link 82, having a latch projection 83 thereon engaging a lever 84 pivoted on the pin 71. Lever 84 engages a projection 85 fixed to a bail 86 extending parallel to bail 72 and provided with inclined slots 87, 88. Pin 75 which projects through inclined slot 73 in bail 72 also projects through inclined slot 87 in bail 86 and the other pin (not shown) that projects through inclined slot 74 also projects through inclined slot 88. A spring 89 stretched between the end of link 82 and pin 68 tends to urge link 82 into such position that latch projection 83 engages lever 84. As one end of link 82 engages under one end of a lever 90 pivoted on a fixed pivot the position of which is indicated at 91, the spring 89 tends to move lever 90 in an anti-clockwise direction. The other end of lever 90 is thus urged against a roller 92 carried on bell crank lever 80 and so this bell crank lever is being urged into clockwise rotation about its pivot 79. This bell crank lever

80, is, however, prevented from rotating, when lever 53 is in an unselected position by a stationary rod 93 and the latch projection 83 is unable to engage lever 84.

When lever 53 is selected and rotates anti-clockwise about its pivot 56, the pivot 79 of bell crank lever 80 is moved to the left in Fig. 3 and bell crank lever 80 rotates clockwise through a small arc and allows lever 90 to be rotated sufficiently anti-clockwise to allow link 82 to rise and latch projection 83 to engage lever 84. When therefore lever 65 is moved clockwise by cam 64 and both links 66 and 82 are moved to the right in Fig. 3 both levers 70 and 84 are rotated anti-clockwise about rod 71. Lever 70 lifts bail 72 as previously described and lever 84 lifts bail 86 in a similar manner. Bail 72 engages pin 76 and so lifts the feeding pawl 12 from engagement with rack 14 as previously described and simultaneously bail 86 engages a pin 94 fixed to retaining pawl 13 from engagement with rack 15. As both the feeding pawl 12 and the retaining pawl 13 are out of engagement with their respective racks the spring in drum 48 acts through steel tape 46 to draw the typewheel carriage 1 to the left in Fig. 1 until it engages the end of a lever 95, the other end of which is fixed to the plunger of a dash pot 96 and so the carriage 1 is brought to rest.

It is to be understood that the carriage return mechanism does not require any alteration to adapt it for a printing telegraph receiver for printing from right to left, but that the only change necessary, in addition to those mentioned above for character spacing, is the reversal of the positions of the spring drum 48, lever 95 and dash pot 96 to the other end of the platen 7.

Fig. 3 also shows the mechanism for back-spacing the carriage 1 through one character space in response to an appropriate signal. When a signal allotted for this purpose is received the code function-selector-members such as 21, 22 are rotated into such positions as to permit the back space function lever 52 to be moved by its spring 54 into selected position. Pivoted at 97 on function lever 52 is a bell crank lever 98, similar to bell crank lever 80, and carrying a roller 99 engaging a lever 100, similar to and pivoted on the same pivot 91 as lever 90. Lever 100 engages a link 101 having a latch projection 102 thereon adapted to engage a lever 103 pivoted on rod 71. Lever 103 engages the same projection 85 on bail 86 as is engaged by lever 84. Link 101, however is pivoted on a pin 104 fixed to a lever 105 and is urged towards clockwise rotation about pin 104 by a spring 106 stretched between the end of link 101 and a pin 107 fixed to lever 105.

Lever 105 is operated by the same cam 64 as operates lever 65 but, as the end of lever 105 follows a portion of the cam 64 that is 180° at any instant from the portion followed by lever 65, the actions of the cam 64 are conveniently shown on the timing diagram Fig. 5 as if they were due to two separate cams. The action of cam 64 on lever 65 is shown in line R of Fig. 5 and its action on lever 105 in line S of Fig. 5.

The operation of lever 105 on link 101 is the same as the operation of lever 65 on link 82. The action of bell crank lever 98 when lever 52 is moved into selected position is the same on link 101 through lever 100 as the action of bell crank lever 80 on link 82 when lever 53 is moved into selected position. As the actions take place at different relative times, however, the results are different. The action of bell crank lever 98 in effecting back-spacing will be better understood from reference to Fig. 6*a* and Fig. 6*d*. As previously described, the non space vane 58, Fig. 3, is held in horizontal position by projection 60 on lever 52 when that lever moves into selected position. In consequence feeding pawl 12 is lifted out of engagement with feeding rack 14 until the latter has been moved to the right to a position shown in Fig. 6 (*d*) as compared with Fig. 6 (*a*). Assuming that pawl 12 was, before being lifted, in engagement with the vertical end of tooth 43 as shown in Fig. 6 (*a*) it is allowed to drop back into engagement with rack 14 into the position shown in Fig. 6 (*d*), i. e. on the sloping face of tooth 45. The rack 14 then continues its travel to the right in Fig. 6 until it reaches a position corresponding to that shown in Fig. 6 (*b*) but with pawl 12 now against the vertical end of tooth 42. At this time the action of cam 64, Fig. 3, on lever 105 moves link 101 to the right and through lever 103 and rack 86 lifts retaining pawl 13 from engagement with rack 15. As the rack 14 returns to the left, therefore, the pawl 12 remains in engagement with the vertical face of tooth 42, the carriage 1 with the pawl 12 being drawn to the left by the tension of the spring in the drum 48.

As shown in the timing diagram Fig. 5, the function cam sleeve which carries cam 32, Fig. 2 and cam 64, Fig. 3 is released for rotation by the action of a cam (line M of Fig. 5) on the translator cam sleeve and in normal operation of the receiver the function cam sleeve is released for rotation through one revolution for each signal received. For certain signals, however, the function cam sleeve may be released for more than one revolution. One of these signals is the tabulate signal and results in the selection of a tabulate function lever 108, Fig. 4, and this in turn results in the release of the function cam sleeve for a plurality of revolutions.

Fig. 4 shows the normal arrangement whereby the function cam sleeve 109 is clutched to the function shaft 110 under the control of a cam 111 on the translator cam shaft. As previously described the translator cam sleeve is rotated once for every received signal. The timing of cam 111 thereon is shown in line M of Fig. 5. This cam 111 acts through the medium of an operating arm 112 Fig. 4 upon a detent 113 that is normally holding a pawl 114 pivoted on the spacing cam sleeve 109 out of engagement with a ratchet 115 driven from the function shaft 110. For clearness the pawl 114 is shown in Fig. 4 as being in engagement with the ratchet 115 but normally it is held out of such engagement by means of the detent 113.

The detent 113 forms part of a lever 116 pivoted at 117 on a spring arm 118 which is fixed to a support 119 mounted on the framework of the machine.

The arm 112 is urged by spring 120 into engagement with cam 111 and when the hollow of this cam is presented to the end of the arm 112, the arm is moved by the spring 120 in a clockwise direction. A finger 121 on the arm 112 presses on an upturned portion 122 of a detent trip finger 123 which is pivoted on the same pivot 124 as the arm 112. The detent trip finger 123 in moving clockwise engages an upturned portion 125 of the lever 116 and rotates this lever against a spring 126 to withdraw the detent 113 from engagement with the pawl 114. The pawl 114 is thereupon pulled by a spring (not shown) into engagement with the ratchet 115 and in consequence the function cam sleeve

109 rotates with the shaft 110. In Fig. 4 the cam 111 and the levers operated thereby are shown in the positions they occupy when detent 113 has just been withdrawn from pawl 114 but this latter is for clearness shown in the position when the cam sleeve 109 has completed half a revolution.

After the detent 113 has been removed from engagement with the pawl 114 it is restored into the path of the pawl since the further rotation of cam 111 allows the finger 121 to be withdrawn from engagement with the detent trip finger 123 and the lever 116 is rotated by its spring 126 in an anti-clockwise direction. It will be noted that there is a second lever 127 similar to lever 116 pivoted on a spring arm 128 similar to spring arm 118 and connected with lever 116 by the spring 126. The pawl 114 rides under the lever 127 and after the pawl has been engaged by detent 113 lever 127 restricts any rebound.

The operation of the tabulator lever 108 is also shown in Fig. 4. A three armed lever 129 is pivoted on the framework of the machine at 130 and an arm thereof, 131, is held against the tabulate function lever 108 by a spring 132. When therefore the tabulator function lever is selected and moves to the right in the figure the three armed lever 129 is free to be rotated in a clockwise direction to a sufficient extent so that a hook 133 on one of the arms 134 engages a projection 135 on the detent trip finger 123 and so holds this finger 123 in its extreme clockwise position. The detent 113 is thus held out of the path of the pawl 114 and the function cam sleeve 109 continues to rotate for more than one revolution. This rotation will continue, the typewheel carriage being moved one step at each revolution in the manner previously described until a bail (not shown) on the carriage engages a turned over portion 136 on the third arm 137 of the three armed lever 129 and so removes the hook 133 from engagement with the projection 135 on the detent trip finger 123 and the detent 113 is free to be pulled by its spring 126 into the path of the pawl 114 and the rotation of the cam sleeve 109 is arrested.

When receiver is operated from a keyboard transmitter at a distant station the operator at the latter is provided with a similar receiver on which a home record is made. The operator therefore depresses the tabulating key and then waits until the carriage on his own machine has come to rest before depressing the next key. As the typewheel carriages on both machines move along the line at the same rate, both carriages come to rest at the same moment.

I claim:

1. Printing telegraph receiver comprising a platen mounted in a stationary part of the framework, a type carriage mounted for movement parallel to said platen, resilient means for urging said carriage in a first direction, a feeding rack and a retaining rack respectively, a first and second pawl pivoted on said type carriage, respective of said pawls adapted to engage different of said racks, means for selectively bringing each of said racks into engagement with its associated pawl, each of said racks extending parallel to and the full extent of said platen and provided with teeth the width of each of which is equal to a character space, a function cam sleeve, means for releasing said cam sleeve for rotation in response to each received signal, means for reciprocating said feeding rack endways in a second direction a distance a little more than the extent of one tooth during each rotation of said cam sleeve for character spacing movement of said carriage in a second direction and means for selectively removing in response to a received signal said first pawl from engagement with said feeding rack during a sufficient part of the reciprocation of the latter as to prevent a character spacing movement of said carriage.

2. Printing telegraph receiver as claimed in claim 1 comprising a bail parallel to said racks and adapted when lifted to lift said first pawl from engagement with its rack, a first cam on said cam sleeve for reciprocating said feeding rack, a second cam on said cam sleeve for reciprocating a link, a level for lifting said bail, and means for selectively holding said link in engagement with said level to cause said lever to lift said bail.

3. Printing telegraph receiver as claimed in claim 2 comprising a second bail parallel to said racks and adapted when lifted to lift said second pawl from engagement with its rack, a first lever for lifting said bail a second link also reciprocated by said second cam, and means for selectively holding both said first and second links in engagement with their respective levers to cause said levers to lift both pawls from engagement with their respective racks.

4. Printing telegraph receiver comprising a platen mounted in a stationary part of the framework of said receiver, a type carriage mounted for movement parallel to said platen, spring means for moving said carriage in one direction, a first and a second pawl pivoted on said type carriage, a feeding rack and a retaining rack, respectively, means to urge each of said pawls into engagement with a different one of said racks, each of said racks extending parallel to and the full extent of said platen and provided with teeth the width of each of which is equal to a character space, a first and a second bail extending parallel to said racks, said bails being adapted to lift the first and second pawls respectively from engagement with their respective racks, a function cam sleeve, means for releasing said cam sleeve for rotation in response to each received signal and means for reciprocating said feeding rack endways in an opposite direction a distance a little more than the extent of one tooth during each rotation of said cam sleeve for character spacing movement of said carriage, said means comprising a first cam means on said cam sleeve for reciprocating said feeding rack, a second cam means on said cam sleeve for reciprocating a first and a second link during the feeding movement of said feeding rack, a third cam means on said cam sleeve for reciprocating a third link during the return movement of said feeding rack, a first lever in engagement with said first bail, a second and a third lever in engagement with second bail, means for selectively holding said first, second and third links in operative engagement with said first, second and third levers respectively to cause said levers to lift their corresponding bails and selectively to effect carriage return and back-spacing.

5. Printing telegraph receiver as claimed in claim 4 comprising a translator cam sleeve, means for invariably releasing said translator cam sleeve for rotation through one revolution for each received signal means on said translator cam sleeve for releasing during its rotation said function cam sleeve for rotation.

6. Printing telegraph receiver comprising a platen mounted in a stationary part of the frame-

work of said receiver, a type carriage mounted for movement parallel to said platen, a first and a second pawl pivoted on said type carriage, a feeding rack and a retaining rack respectively, each of said racks extending parallel to and the full extent of said platen and provided with teeth the width of each of which is equal to a character space, means for urging each of said pawls into engagement with respective of said racks, means responsive to a back-spacing signal for removing said first pawl from engagement with the feeding rack during the feeding movement of said rack, releasing it for engagement with said rack during the return movement of said rack and during said return movement releasing the second pawl for engagement with said retaining rack, a function cam sleeve, means for releasing said cam sleeve for rotation in response to each received signal,

said means for removing said pawls under control of said function cam sleeve.

7. Printing telegraph receiver as claimed in claim 6 comprising means responsive to a tabulator signal for causing said function cam sleeve to be rotated for a predetermined plurality of revolutions.

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The following references are of record in the file of this patent:

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