June 2, 1925. 1,540,710

H. PFANNENSTIEHL

PRINTING TELEGRAPHY

Filed July 29, 1918 4 Sheets-Sheet 1

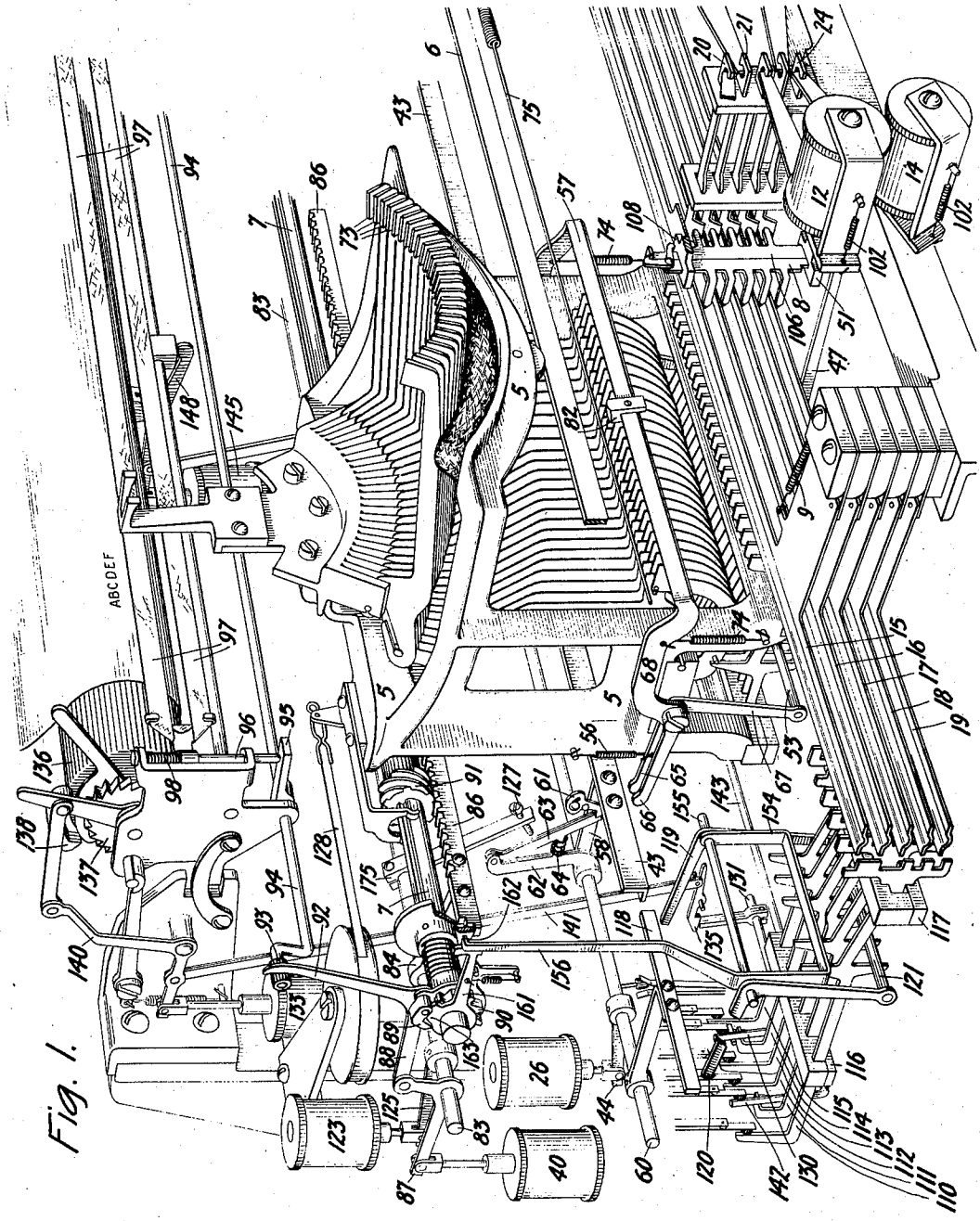


Fig. 1.

Inventor:
Harry Pfannenstiehl
by J. E. Roberts Att'y.

June 2, 1925. 1,540,710

H. PFANNENSTIEHL

PRINTING TELEGRAPHY

Filed July 29, 1918 4 Sheets-Sheet 2

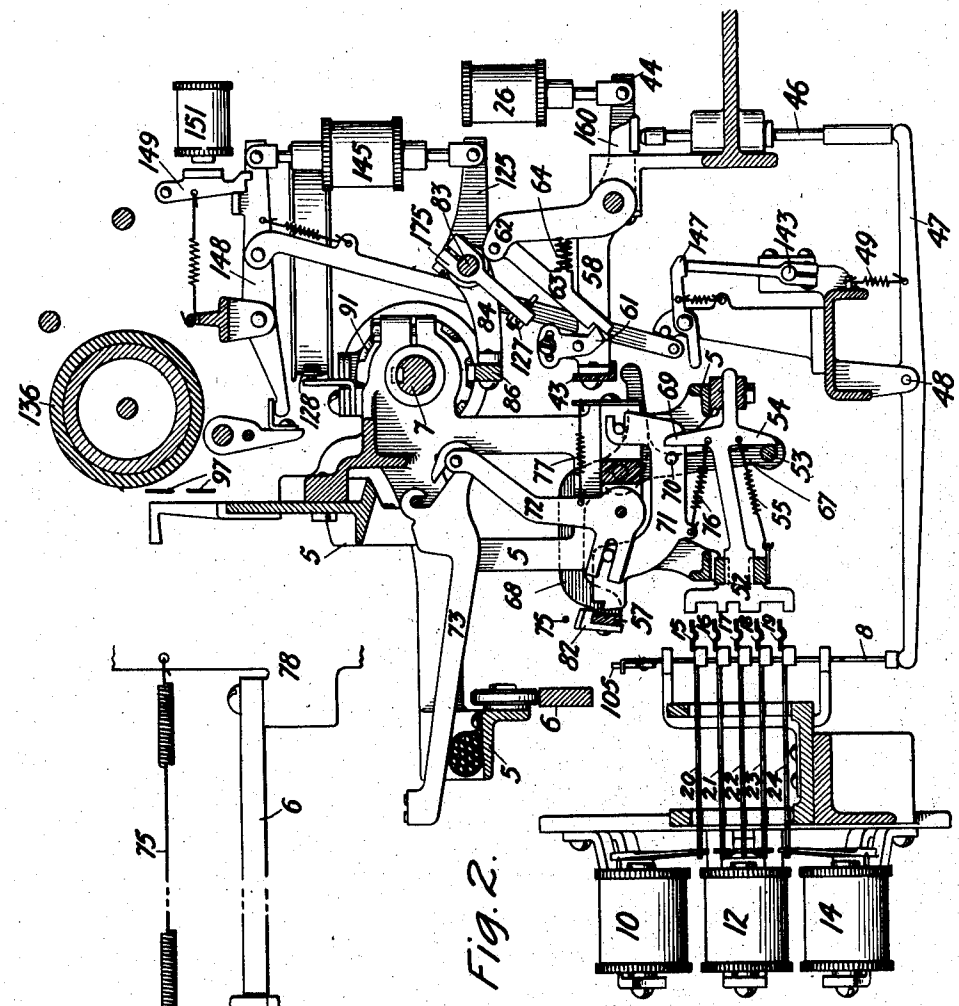


Fig. 2.

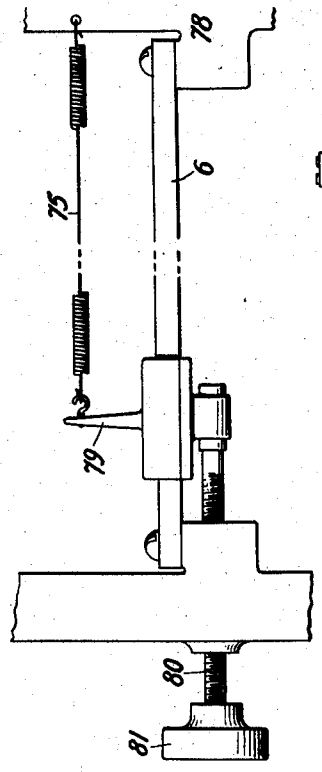


Fig. 6.

Inventor:
Harry Pfannenstiehl
by J. E. Robertson Att'y.

June 2, 1925. 1,540,710

H. PFANNENSTIEHL

PRINTING TELEGRAPHY

Filed July 29, 1918 4 Sheets-Sheet 3

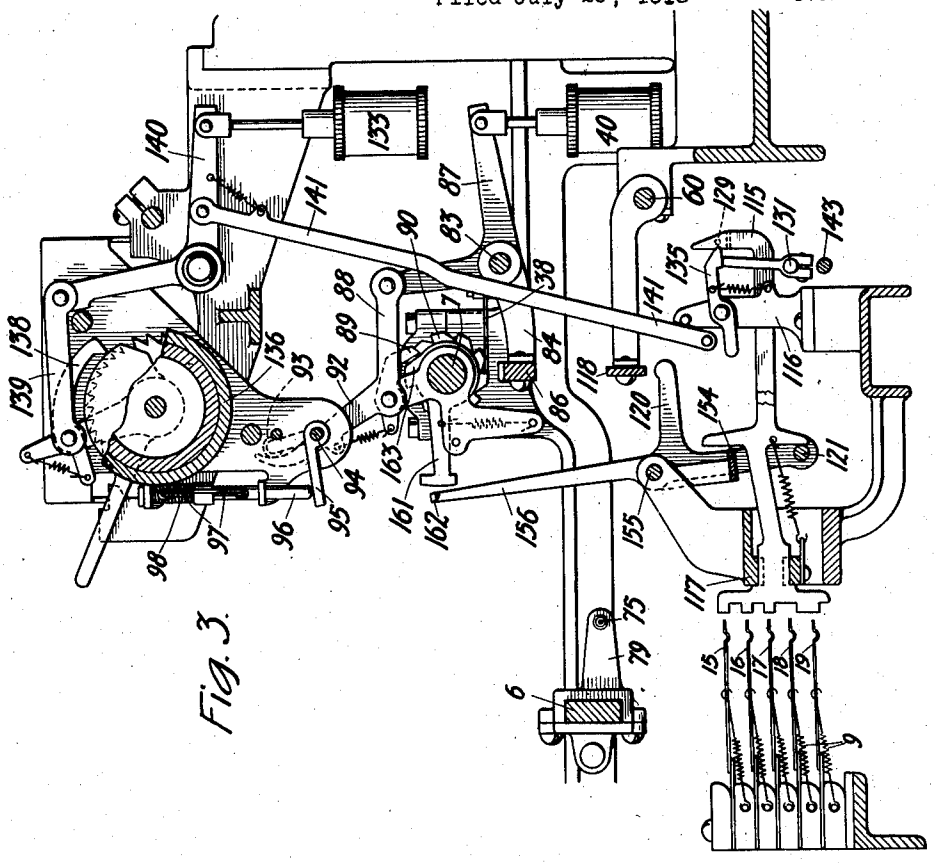


Fig. 3.

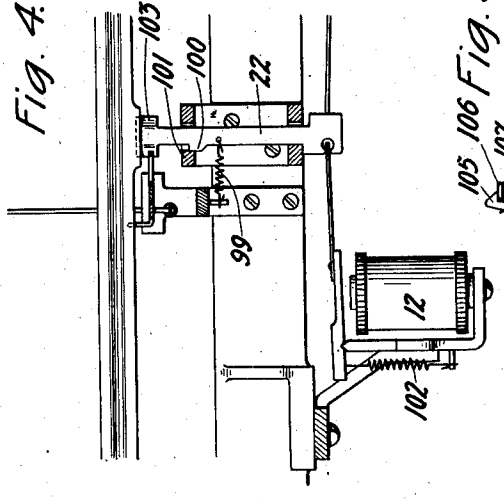


Fig. 4.

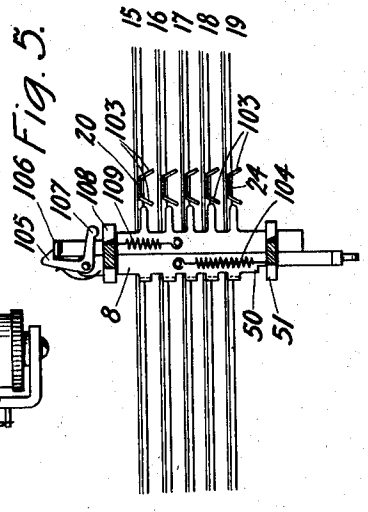


Fig. 5.

Inventor:
Harry Pfannenstiehl
by J. E. Roberts Att'y.

June 2, 1925. 1,540,710

H. PFANNENSTIEHL

PRINTING TELEGRAPHY

Filed July 29, 1918 4 Sheets-Sheet 4

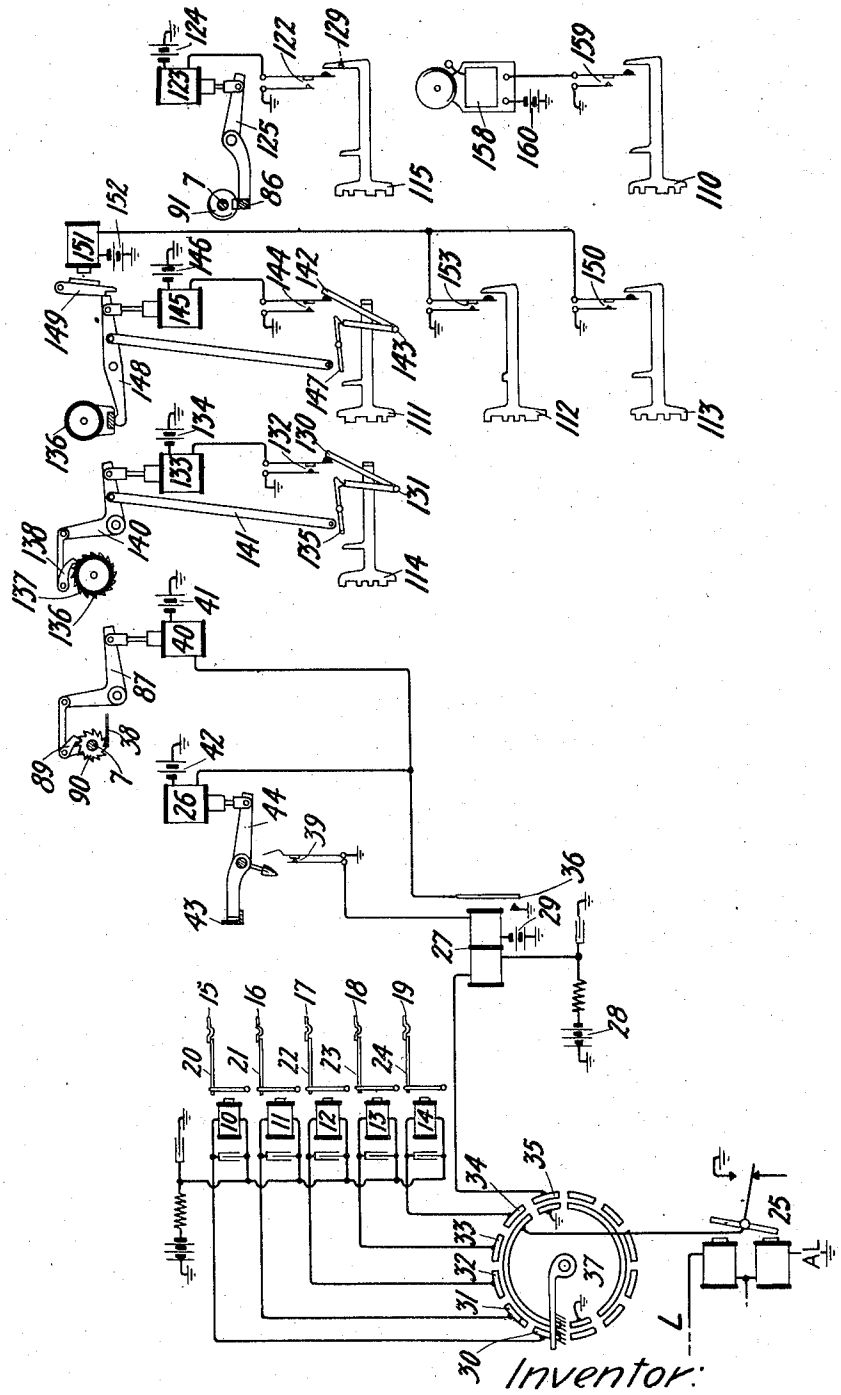


Fig. 7.

Inventor:
Harry Pfannenstiehl
by J. E. Roberts Atty.

Patented June 2, 1925. 1,540,710

UNITED STATES PATENT OFFICE.

HARRY PFANNENSTIEHL, OF ORANGE, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PRINTING TELEGRAPHY.

Application filed July 29, 1918. Serial No. 247,254.

To all whom it may concern:

Be it known that I, HARRY PFANNENSTIEHL, a citizen of the United States, residing at Orange, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Printing Telegraphy, of which the following is a full, clear, concise, and exact description.

This invention relates to printing telegraphy and particularly to an improved type of printing telegraph receiving apparatus wherein the printing of characters and various auxiliary operations are performed by electro-mechanisms controlled by line current impulses.

One of the principal objects of this invention is to provide a telegraph receiver of the above class wherein all the necessary functions are performed in a reliable and efficient manner at a high rate of speed.

Another object is the provision of means whereby the printing of one character may be effected simultaneously with the selection of the next succeeding character.

A further object is to provide a receiving printer of the above type suitable for printing messages in page form and one which is capable of producing a plurality of duplicate copies.

To the above ends, means are provided for distributing a series of current impulses to a plurality of selecting and operation controlling magnets, which magnets control the selection of the desired character to be printed and operation to be performed. The invention disclosed in the accompanying drawings embodies a telegraph receiving printer comprising stationary selecting mechanism, a stationary paper platen and printing elements adapted to be moved transversely of the platen. The printing mechanism disclosed is of standard typewriter construction and, in fact, the invention is applicable to any suitable typewriting mechanism of the type bar class.

Various auxiliary functions, such, for example, as line feed, carriage return and line feed, shift, unshift, unshift and character space, automatic signaling, etc., are controlled by a plurality of special code bars selectively controlled by line current impulses. The various auxiliary operations of the printer are performed by electromagnets cooperating with bell crank levers or suitable operative members to effect the desired operation.

The selecting mechanism consists of a plurality of stationary selecting magnets and a corresponding number of horizontal selecting bars controlled by said magnets. The selecting bars extend transversely and entirely across the printer and are adapted to be raised and lowered but are not capable of endwise movement.

A plurality of code bars or permutation bars are provided and the arrangement of those bars with respect to the selecting bars is such that when any combination is set up by the selecting magnets, only one of the code bars will be permitted to move forward and mesh with the selecting bars. Each of the code bars controls a pull bar which is adapted to be moved forward by a code bar when selected into the path of a reciprocating printing bar, which printing bar is, in the present instance, controlled by an electromagnet. When a pull bar is moved forward and engaged by the printing bar, a type face carried by the selected type lever is thrust against the paper platen and the selected character printed. The selecting and printing operations are so timed that, while one character is being printed, the next succeeding character may be selected so that there is no time lost between the selecting and printing operations.

The above and other features of this invention will be fully set forth in the following description and claims and will be more readily understood by reference to the accompanying drawings, in which Fig. 1 is a perspective view of the printer as assembled with parts broken away to more clearly show the cooperation between the selecting mechanism and the movable type carriage and between the various stationary and movable parts; Fig. 2 is a vertical sectional view taken just to the right of the center of Fig. 1 with the movable type carriage in the center; Fig. 3 is a vertical sectional view through the special selecting mechanism to the left-hand side of Fig. 1; Fig. 4 is a plan view of a portion of the selecting mechanism shown in Fig. 1; Fig. 5 is a front sectional view of a portion of the selecting mechanism; Fig. 6 is a view of an adjust-

able device for accelerating the action of the printing bar; and Fig. 7 is a diagrammatic showing of the circuits at the receiving station.

The mechanism herein disclosed is operated preferably by various combinations of five positive and negative selecting impulses with an additional impulse following each group of selecting impulses for controlling the printing and various auxiliary operations. The impulses may arrive over a line L from a distant station and may be distributed to the selecting and operation-controlling magnets by means of a Baudot distributor, as shown in Fig. 7, or any of the other well-known distributing systems may be employed.

In order to simplify the drawings, a considerable portion of the frame structure has been omitted. Also various springs which would normally be employed for restoring various operating parts to normal, have been omitted in order to avoid complicating the drawings. It is to be understood, however, that suitable supporting means may be provided for the printer and selecting mechanism, and that suitable springs may be provided wherever necessary for assisting in the operation of parts and for restoring the various parts to normal.

In the accompanying drawings are shown a stationary paper platen, a movable type carriage, and means for selectively operating the desired type carried by the movable type carriage. The movable type carriage, including the type levers, bell crank levers, pull bars, universal printing bar, etc., is adapted to be moved from left to right transversely of the machine against the tension of a spring member one character space for each character printed, and the carriage may also be spaced without printing upon receipt of a special combination of line current impulses. The carriage is adapted to be released by a special group of line current impulses and returned to normal under the action of a spring for commencing a new line.

Referring to the drawings, and particularly to Fig. 1, the invention is illustrated in combination with a type carriage of a form so well known as to require no detailed description. The type carriage 5, carrying the type bars, connecting links, code bars, etc., is supported by a portion of the frame 6 and a rotatable shaft 7.

The selecting mechanism consists of five selecting magnets, 10, 11, 12, 13 and 14, five horizontal selecting bars, 15, 16, 17, 18 and 19, extending entirely across the printer at right angles to the code bars, and five latches, 20, 21, 22, 23 and 24, extending from the armatures of the selecting magnets to the selecting bars. The selecting bars are normally held in the position shown by means of the notched member 8 and when released and permitted to drop, they are held in their lowered positions by means of springs 9 until restored by the upward movement of the member 8, in which position they are again held by the member 8 until a new selection has been set up.

Another feature of the selecting mechanism is an overlap arrangement best shown in Figs. 4 and 5. By means of the overlap arrangement herein provided, after a selection has been set up, a new selection may be made without interfering with or delaying the printing of the character previously selected.

Selecting and printing.

A better understanding of the apparatus may be obtained from a description of a particular character selection and the various operations incident thereto.

Assume that a series of impulses for selecting the character D is coming in over the line L, and further assume that the character D is selected by five impulses combined in the following order;—positive, negative, negative, positive, negative. Let it also be assumed that at the receiving station is a polarized relay 25 which responds only to positive impulses and which controls the energizing circuits of the selecting magnets 10 to 14, inclusive. It may also be assumed that the receiving distributor 37 rotates in synchronism with a corresponding sending distributor at a distant station and therefore the line impulses are distributed sequentially to the selecting magnets 10 to 14, inclusive. Then since the first and fourth impulses are of positive polarity, current will be supplied to the selecting magnets 10 and 13, and since the second, third and fifth impulses are of negative polarity, no current will be supplied to selecting magnets 11, 12 and 14. Selecting magnets 10 and 13, when energized, attract their armatures and withdraw their respective latches 20 and 23 from engagement with the corresponding selecting bars 15 and 18. The selecting bars 15 and 18, however, do not fall the instant the latches are withdrawn because the bars are supported by the member 8, which member is controlled by printing magnet 26. The five selecting impulses have now been received, the selecting magnets 10 and 13 have been energized and the selecting bars 15 and 18 have been conditioned for action awaiting receipt of the sixth or printing impulse. After the distributor brush has passed over the first five segments, 30, 31, 32, 33 and 34, which segments are connected to the five selecting magnets, the distributor brush then engages segment 35 and completes a circuit through receiving start relay 27, from grounded battery 28, to ground at

the distributor. Current normally flows through the left-hand winding of relay 27 from grounded battery 29 to contacts 39 and ground, but owing to the high resistance of this winding the relay is not sufficiently energized to cause the attraction of armature 36 until the circuit is closed through the other winding from battery 28. When current is allowed to flow through both windings of relay 27, the armature 36 is attracted to complete parallel circuits through printing magnet 26 and character-spacing magnet 40. The circuit through the printing magnet extends from grounded battery 42, winding of magnet 26 to armature 36 and front contact thereof to ground and the circuit through the character-spacing magnet extends from grounded battery 41, winding of magnet 40, to armature 36 and front contact thereof to ground. Although the energizing circuits through the printing and character-spacing magnets are established simultaneously, owing to the fact that the printing operation does not take place until an appreciable time after the striker bar 43 has been actuated, the spacing operation may take place prior to the printing operation. It will also be noted that magnet 26, by operating rocker arm 44, opens the contacts 39, thereby breaking the circuit through the high resistance winding of the start relay 27. While the current normally flowing through the high resistance winding of relay 27 is insufficient to cause the attraction of armature 36, it is sufficient to hold the armature 36 in its attracted position until the circuit is broken at contacts 39. The printing magnet 26, in addition to actuating the striker bar 43, permits a plunger 46 to move vertically and therefore permits the rocker bar 47 to turn about its pivotal point 48 under the action of spring member 49. The member 8, in responding to the movement of the arm 47, is pulled down by suitable springs until the shoulder 50 carried thereby, engages the frame portion 51. The selected bars 15 and 18 will follow the downward movement of the member 8 and will permit one and only one of the code bars 52 to move forward, when released, astride the selecting bars. The code bars 52 are normally held in the position shown by the universal bar 53 which extends entirely across the type carriage in front of extensions 54 carried by the code bars, the forward pull of springs 55 being insufficient to counteract and overcome the pull of springs 56. The universal bar 53 and the printing bar 57 are moved out of their normal positions by means of the striker bar 43 which is forced downwardly when supporting rod 60 is rotated, due to the energization of printing magnet 26. The striker bar is carried by two bracket arms 58 and 59 which are pivotally secured to the supporting rod 60. The rod 60 may be journaled in the sides of the printer frame or it may be supported in any suitable manner. The bar 43 may be normally held in the position shown by suitable springs. On each of the bracket arms 58 and 59 is secured an adjustable member 61, one of which is clearly shown in Fig. 2. On the supporting rod 60 and adjacent each of the bracket arms 58 and 59 is rigidly mounted an arm 62, which arms are adapted to be operated by the rotation of rod 60. Each of the arms 62 carries a member 63 which is normally held in engagement with its corresponding adjustable member 61 by spring member 64 but may be held away from the members 61 for certain purposes, as will presently appear. It will be seen by reference particularly to Figs. 1 and 2, that when the striker bar 43 is forced downward, it will act on the extensions 65 and 66 of bell crank lever 67 and arm 68 which will move the universal bar 53 forward and the printing bar 57 upward. All of the code bars are normally held clear of the selecting bars by the universal bar 53 and when the universal bar is moved forward all of the code bars, due to the action of the springs 55, will also move forward slightly but only the selected code bar will be permitted to move forward astride the selecting bars. As the selected code bar moves forward, an extension 69 thereof engages a pin 70 on the corresponding pull bar 71 and moves its respective pull bar into the path of the reciprocating printing bar 57 so that on its downward stroke the printing bar strikes the end of the selected pull bar and by means of a link 72 connecting each of the pull bars with its corresponding type bar 73, the selected type is thrust against the paper platen in a well-known manner. By selecting a printing magnet of proper type and size the downward stroke of the striker bar 43 can be made exceedingly rapid and consequently the forward stroke of the universal bar and the upward stroke of the printing bar can be made equally rapid. By a proper selection of springs 56, 74 and 75, the universal bar and the printing bar may be returned to normal with equal rapidity and, in fact, it is desirable that the springs 74 and 75 be of such strength that the printing bar will strike the selected pull bar with such force that the pull bar will travel ahead and disengage itself from the printing bar and permit the spring 76 to return the actuated pull bar to normal position as the selected code bar is restored by the universal bar 53 under the action of springs 56. The quick action of the printing bar causes the selected type bar to be thrown against the paper platen with sufficient force for manifolding and may also be sufficient to cause the type bar to return to normal due to rebound, or the

return action of the type bar may be increased by providing a spring, such as 77, connected to each of the connecting levers 72.

The spring member 75 (Fig. 6) preferably consists of a steel piano wire stretched tightly above the universal printing bar 57. One end of the spring 75 may be rigidly connected to the frame portion 78 and the other end may be connected to an adjustable upright 79. By means of the threaded screw 80 and knob 81, the upright 79 may be moved transversely of the printer and the tension of the spring 75 may be accordingly controlled. Near the center of the universal printing bar 57 is a block 82 which is adapted to engage the spring 75 when the printing bar is moved upwardly. The primary purpose of spring 75 and the adjustable means therefor is to adjust the throw or force of the type bars for making various numbers of duplicate copies.

The function of the code bars is to move the pull bars corresponding to the character selected into the path of the reciprocating printing bar 57. Therefore, as soon as a particular pull bar has been engaged by the printing bar, the selected code bar should be withdrawn so that the selecting bars may be stored and a new selection set up. The springs 56 should therefore be of such strength as to restore the universal bar 53 the instant the printing bar engages the selected pull bar. Immediately after the selected code bar is withdrawn by the universal bar 53, arm 160, which is keyed to rod 60, acting upon plunger 46, will rock the arm 47, and raise the member 8 to restore the selecting bars to normal, ready for a new selection.

Spacing.

Spacing between characters is effected by a spacing magnet and in the embodiment disclosed the type carriage is moved forward one step or one character space before each character is printed. A pivotally mounted rod 83 is provided which may be journaled in the frame of the machine or supported in any suitable manner. Rigidly secured to the rod 83 are two bracket arms 84 and 85 (only one of which is clearly shown) which carry a rack 86. The letter space magnet 40 operates a bell crank lever 87. To one end of the lever 87 is connected an operating lever 88, on the end of which is a pawl 89 adapted to engage the teeth of a ratchet wheel 90 whenever the arm 88 is moved forward by the bell crank lever 87, due to the energization of the magnet 40. The rotation of the ratchet 90 effects rotation of the shaft 7 and by means of a worm wheel 91 mounted thereon and cooperating with the rack 86 the type carriage 5 is moved to the right one step or one character space for each energization of the magnet 40. A holding pawl 38 is provided to prevent backward rotation of the ratchet wheel 90.

The spacing mechanism is so arranged that the type carriage will be stepped ahead immediately preceding the printing of a character, although spacing between characters may be effected if desired, after the printing of each character.

The magnet 40, in addition to spacing the type carriage, operates a ribbon control mechanism which is normally in the position shown in Fig. 1. The operating lever 88 has an upwardly extending arm 92 which, when operated, engages a crank arm 93 and, as will be clearly seen from Fig. 1, effects rotation of the rod 94. The rod 94 carries two bracket arms 95, one of which is at each end of the platen frame, which act upon pins 96 and thereby cause the inking ribbon 97 to be moved in front of the type bar just as it strikes against the paper platen. Springs 98, acting upon pins 96, serve to hold the ribbon down from in front of the printed characters so that they are visible at all times except at the instant a character is being printed. Any suitable feeding mechanism may be provided for feeding the ribbon transversely of the machine.

Overlap arrangement.

The purpose of the overlap arrangement is to make possible the selection of a new character while the preceding character selected is being printed. Each of the latches 20, 21, 22, 23 and 24 is provided with a spring 99 normally tending to pull the latch sidewise so that when the latches are withdrawn by means of the selecting magnets from beneath the selecting bars, the extension 100 carried by each of the latches will be drawn over and back of the frame portion 101 and will remain locked in their withdrawn positions until forced sidewise again so that the extensions 100 will clear the frame portion 101. As soon as the latches are unlocked or the extensions 100 are moved away from engagement with the frame 101, they will be returned by the action of the springs 102 connected to the armatures of the selecting magnets until the bent-over portions 103 (Fig. 5) abut against the selected bars, in which position the latches will be held until the selected bars are restored to normal, thereby permitting the latches to move in under the restored bars providing a succeeding selection does not interfere with the complete return of the latches. When the member 8 is released by the rocker arm 47 it is pulled down by the action of spring 104 until the offset portion 50 engages the frame portion

51 (as clearly seen in Figs. 1 and 5). As the member 8 moves downward, the pawl 105 carried thereby engages the end of a sliding member 106 carrying a plurality of extensions or an extension corresponding to each of the latches 20 to 24, inclusive. As above stated, when the latches 20 to 24, inclusive, are actuated they are drawn to the left by the action of springs 99 and remain locked against the frame portion 101 until they are moved to the right or released. The sliding member 106 in its downward movement, due to the corresponding movement of member 8, causes the extensions carried thereby to engage the beveled end portions of the latches 20 to 24, inclusive, thereby forcing them sidewise until the extensions 100 clear the frame portion 101, thereby permitting the latches to return to normal. The members 8 and 106 and pawl 105 are so arranged that the member 106 is forced downward just far enough to free the selected latches 20 to 24 inclusive when the extension 107 of pawl 105 engages the frame portion 108, thereby releasing the slidable member 106 and permitting it to return to normal under the action of spring 109.

If a succeeding selection, coming before the selected bars are restored, utilizes one or more positive impulses corresponding to one or more of those of the preceding selection, then the latches will be actuated by their respective magnets and remain in their actuated positions until the member 106 is again forced downward due to the action of the rockable member 47 and sliding member 8. The operation of the member 106 should take place preferably immediately after the selected bars are actuated so that the released latches may return and abut against the selected bars and be in position to respond to the next selection, if required, or to move under the bars the instant they are restored to normal if they are not required for a succeeding selection. By means of this arrangement a new selection may be set up while the preceding character selected is being printed. Thus it will be seen that the purpose of the locking and restoring means for the latches is twofold. First, by locking the latches in their actuated positions until the selected bars are lowered, the bars prevent the latches from returning and interfering with the downward movement of the selected bars, and secondly, by releasing the selected latches as soon as the bars are lowered, the latches are placed in readiness to move in under the selected bars the instant the latter are restored or one or more of the latches may again be selected and locked up without first moving under the selected bars, providing the succeeding group of selecting impulses has one or more positive impulses in common with those of the preceding group.

Auxiliary selections.

In addition to selecting and printing various characters and providing means for spacing between characters and words, as hereinbefore described, there are various auxiliary operations to be peformed, such, for example, as carriage return and line feed, line feed, platen shift, platen unshift, automatic signaling, etc.

To the left-hand side of Fig. 1 is shown a plurality of special code bars, 110, 111, 112, 113, 114 and 115, which are similar to the code bars 52 mounted on the movable type carriage 5. The special code bars are adapted to slide in recesses provided in stationary supports 116 and 117 and are selectively controlled by line current impulses in the same manner as the character code bars 52; that is, the various auxiliary operations are selectively controlled by code signals which are transmitted in the same manner and by the same means as the various character signals.

Carriage return and line feed.

When it is desired to return the type carriage to the left to commence a new line, it is also desirable that the paper platen be rotated in order to feed the paper forward to present a clean surface for the next line of characters. This is sometimes accomplished by sending one group of impulses over the line to effect the return of the type carriage and another group of impulses to effect the rotation of the platen. However, both operations may be effected simultaneously and by a single group of signaling impulses. The return of the type carriage and the feeding of the paper may be accomplished by sending over the line a group of impulses to cause the selection of a special bar 115, which group of selecting impulses is followed by a sixth or starting impulse as usual. The operation of magnet 26 effects rotation of the rod 60 as hereinbefore described, and forces the auxiliary striker bar 118 (which bar corresponds to the main striker bar 43) down against the action of suitable springs, not shown. The bar 118, acting upon bell crank levers 119 and 120, moves auxiliary universal bar 121 (which bar corresponds to the main universal bar 53) forward and permits the selected code bar 115 to move forward astride the selecting bars 15 to 19, inclusive. As the special code bar 115 moves forward, it closes contacts 122 (Fig. 7) and establishes an energizing circuit for the carriage return magnet 123 from grounded battery 124, winding of magnet 123, contacts 122, to ground. Carriage return magnet 123, when energized, operates a lever 125 which is keyed or rigidly secured to the rod 83, thereby effecting rotation of the latter. To the

rod 83 is also rigidly secured the bracket arms 84 and 85 which carry the rack 86. The rod 83 also carries two rigidly supported members 175 (only one of which is clearly shown in Figs. 1 and 2). At the free end of member 175 is an adjustable pin 127 so arranged that when the rod 83 is rotated the pin will engage the spring pressed member 63 and force it out of engagement with the adjustable pawl 61. The result is that when the rod 83 is rotated by the energization of magnet 123, the rack 86 will be moved out of engagement with worm gear 91 so that the carriage may be returned under the action of spring member 128 and the actuation of member 63 will prevent operation of the universal striker bar 43 while the carriage is being returned to normal position.

The special code bar 115 has a bent-over portion or extension 129 which is adapted when moved forward to engage a member 130 which is pivotally supported at 131 and close an additional set of contacts 132. The closure of contacts 132 establishes an energizing circuit for the line feed magnet 133 from grounded battery 134, winding of magnet 133 and contacts 132, to ground. It will be observed from Fig. 7 that when the member 130 is moved forward to close contacts 132, it will be held in its actuated position by a holding pawl 135 until the magnet 133 has rotated the platen 136 a complete step through the instrumentality of the ratchet 137, pawl 138, lever 139 and bell crank lever 140, at which time the lever 141 will engage the rearward extension of pawl 135 and release the member 130.

While separate magnets are employed for performing the carriage return and line feed operations, it will be seen that both magnets are actuated simultaneously and by a single code group of impulses.

In order that the paper platen 136 may be rotated to line feed at times other than when the type carriage is being returned, a special code bar 114 is provided which, when permitted to move forward, closes contacts 132 and thereby establishes an energizing circuit for the line feed magnet 133, as hereinbefore described.

Platen shift.

The type bars are provided with two rows of type faces, one above the other. The lower row of type is the row generally employed. When it is desired to print from the upper row of type faces, a particular group of signals is transmitted for selecting the special code bar 111 which cooperates with suitable electro-mechanism to raise the paper platen so that when the type bars are operated the type of the upper row will be pressed against the platen. When the code bar 111 is selected and permitted to move forward, it engages member 142, and rotates it about its pivotal point 143, thereby closing contacts 144 to establish an energizing circuit through shifting magnet 145 from grounded battery 146, winding of magnet 145 and contacts 144, to ground. As in the case of the line feed mechanism, the contact controlling member 142 is locked in its actuated position by means of pawl 147 until the platen has been moved to its desired position, at which time the holding pawl 147 is released. When the platen 136 is moved to its extreme shifted position by means of the rocker arm 148, a pawl 149 engages the end of the rocker arm 148, thereby holding the platen in its shifted position until the holding pawl 149 is withdrawn.

Platen unshift.

To unshift or return the platen to normal it is only necessary to unlock the mechanism which holds the platen in the shifted position. Two separate means are provided for operating the unshift mechanism depending upon whether it is desirable to unshift without spacing or to unshift and space at the same time. To unshift without spacing, a group of impulses may be transmitted to select the special code bar 113 which, when permitted to move forward, closes contacts 150, thereby completing an energizing circuit through unshift magnet 151 from grounded battery 152, winding of magnet 151 and contacts 150, to ground. The instant unshift magnet 151 is energized and the pawl 149, which forms a part of the armature of magnet 151, is withdrawn from engagement with the rocker arm 148, the platen 136 returns to normal or moves into position for lower case printing. If it is desired to unshift and space, as when placing a comma, period, semi-colon, etc. after a word (which special characters are invariably carried in the upper case position) and then provide the usual space between words, this may be accomplished by selecting a special code bar 112 which, when permitted to move forward, likewise establishes an energizing circuit for unshift magnet 151 by the closure of contacts 153.

It will be noted that code bar 112 is the only one of the special code bars not provided with an upwardly extending arm to prevent the operation of the spacing mechanism. When the special code bars are selected to perform the various auxiliary operations herein mentioned, it is necessary to provide means to prevent the actuation of the type carriage so that character spacing does not take place except when desired. This is taken care of by providing a lever 156, which cooperates with an arm 161 and prevents the actuating pawl 89 from engaging the teeth of the ratchet wheel 90 when any of the code bars 110, 111, 113, 114 or 115 is selected. When the impulses for

printing a character are received, the magnet 40 is energized and operates the bell crank lever 87 to which is secured the operating lever 88. This latter lever has suitably attached thereto an operating pawl 89 adapted to cooperate with the teeth of ratchet wheel 90 for spacing the type carriage when desired and to be withheld from engagement with ratchet wheel 90 by means of a cam member 163 when spacing is not desired. The pawl 89 when revolved, rides upon the cam surface 163 and, unless the arm 161 is prevented from restoring to normal, the pawl 89 will engage the succeeding tooth of the ratchet wheel 90 for effecting the spacing upon the subsequent energization of magnet 40. However, when any one of the five special code bars is selected, as mentioned above, the lever 156 which is pivotally mounted on the supporting rod 155 and which is adapted to be actuated when any one of the five code bars moves forward, causes the bent over portion 162 to be moved under and back of an extension on the arm 161. The movement of the bent over portion 162 under the extension of the arm 161, thereby maintains the pawl 89 out of engagement with the teeth of the ratchet wheel 90 and prevents movement of the type carriage upon the subsequent energization of magnet 40. The arm 156 is adapted to be restored to normal upon the reception of a succeeding group of impulses which again energizes magnet 40 and moves the levers 87 and 88 together with the pawl 89 and the member 161, and since the special code bar has already been released and restored to normal due to the deenergization of magnet 26, the arm 156 will then move out of the path of the arm 161 and be restored to normal by means of a suitable retractile spring (not shown). The arm 161 is then restored to its normal position by means of the retractile spring secured thereto and permits the pawl 89 to engage a succeeding tooth for stepping the type carriage upon the subsequent energization of magnet 40.

Automatic signaling.

It is desirable that the sending operator be able at all times to signal the receiving operator. For this purpose a bell 158 is provided under the control of a special code bar 110, which, when selected and permitted to move forward, closes contacts 159, thereby establishing an energizing circuit from grounded battery 160, bell 158 and contacts 159, to ground.

Referring to Fig. 7, a condenser is shown connected in parallel with the winding of each selecting magnet for the purpose of prolonging the flow of current through the selecting magnets. This feature is covered in a separate application and forms no part of the present invention.

What is claimed is:

1. In a printing telegraph receiver, a type carriage comprising a plurality of type bars, an electromagnet for moving said type carriage transversely for character printing, and stationary permutation means for selectively controlling the operation of the type bars.

2. In a printing telegraph receiver, a traveling carriage having a plurality of selectable members movable therewith, an electromagnet for moving said type carriage transversely for character printing, a plurality of similar stationary selectable members, and means common to all said members for selecting any one of them.

3. In a printing telegraph receiver, the combination of a carriage having a plurality of individually operable code bars, an electro-responsive device for moving said carriage, and stationary permutation means for selectively controlling the operation of said code bars.

4. In a printing telegraph receiver, a movable type carriage comprising a plurality of printing bars and extensions therefor, a printing magnet, a member arranged transversely of said printing bars, and means operated by said printing magnet for permitting said member to engage an extension of said printing bars to effect the printing of a desired character.

5. In a printing telegraph receiver, a stationary paper platen, selecting mechanism, a plurality of type levers responsive to said selecting mechanism and cooperating with said paper platen for printing any desired character, an electro-magnet for moving said type levers to print the desired characters, and all mechanical means operated directly by said electro-magnet for restoring said selecting mechanism to normal to be in readiness for the selection of a character before the printing of the preceding character selected thereby is completed.

6. In a printing telegraph receiver, selecting mechanism, printing mechanism responsive to said selecting mechanism, an electromagnet for moving said printing mechanism in a transverse direction with respect to said selecting mechanism, a printing magnet, and means controlled by said printing magnet whereby a new character may be selected before the printing of the preceding character selected is completed.

7. In a printing telegraph receiver, a selecting mechanism comprising a plurality of selecting bars movable in a direction transversely of their length, latches for holding said bars in their normal positions, means for withdrawing said latches to permit actuation of said selecting bars, means for moving said selecting bars in a direction transversely of their length following the withdrawal of said latches and electro-re-

sponsive mechanism for restoring said selecting bars to normal.

8. Printing telegraph apparatus comprising a paper platen, a support for said platen, a rocker arm engaging said support, a plurality of movable members, an electromagnet individual to each of said members and means for selectively operating one of said members for causing the energization of said electromagnet and the cooperation thereof with said rocker arm for shifting said platen.

9. Printing telegraph apparatus comprising a paper platen, a support for said platen, a rocker arm engaging said support, an electromagnet operating solely on said rocker arm for shifting the platen, and a latch caused to engage the rocker arm upon the movement thereof for locking the platen in its shifted position.

10. Printing telegraph apparatus comprising a paper platen, a support for said platen, a rocker arm engaging said support, an electromagnet operating solely on said rocker arm for shifting the platen, a latch caused to engage the rocker arm upon the movement thereof for locking the platen in its shifted position, and selectably operated means for withdrawing said latch from engagement with said rocker arm.

11. Printing telegraph apparatus comprising a paper platen, a support for said platen, a rocker arm engaging said support, an electromagnet cooperating with said rocker arm for shifting the platen, a latch caused to engage said rocker arm upon the movement thereof, and an electromagnet controlled by a special group of impulses for withdrawing said latch from engagement with the rocker arm.

12. In a printing telegraph receiver, the combination of a traveling type carriage comprising a plurality of character arms, a selectable member individual to each character arm, and an actuating arm, with stationary selecting bars cooperating with said selectable members to select one of said character arms, and an electromagnet cooperating with said actuating arm to actuate the character arm selected.

13. In a printing telegraph receiver, selecting bars, means for selectively releasing said bars, means for retaining said bars in a normal position, a magnet for rendering the retaining means ineffective to cause the released bars to move from their normal position, code bars cooperating with said selecting bars, and a printing bar operated due to the energization of said magnet for causing the printing of a character in accordance with the code bar selected.

14. In a printing telegraph receiver, permutation bars normally tending to move, means controlled by line current impulses for directly conditioning the permutation bars for movement, an electro-responsive device also controlled by line current impulses, a rocker-arm operated directly by said device when energized for releasing the permutation bars in various combinations, and a plurality of type lever operating elements, one of said operating elements being selected upon the setting of said bars in various combinations.

15. In a printing telegraph receiver, a printing magnet, a movable type carriage comprising a plurality of printing elements, code bars cooperating with said printing elements and carried by said type carriage, and means controlled by said code bars and actuated directly by said magnet to effect the actuation of said printing elements.

16. In a printing telegraph receiver, the combination of a movable type carriage, printing elements carried thereby, electromagnetic means for moving said type carriage, a plurality of selectable code bars, means for causing the selected code bars to control the printing elements, and means cooperating with the code bars for actuating the printing elements to print a desired character.

17. Printing telegraph apparatus comprising a traveling type carriage, a rack, a worm gear traveling with said carriage and cooperating with said rack for advancing the carriage step by step, an electro-responsive device and means operated directly by said device for withdrawing the rack from engagement with the worm gear to permit the return of said carriage.

18. In a printing telegraph receiver, a selecting mechanism comprising a plurality of permutation bars, means for selectively releasing said bars in various combinations, a printing magnet, universal means actuated directly by said printing magnet for permitting the released bars to move to their selecting positions in a number of different combinations, and a plurality of type lever operating elements one of said elements being selected upon the positioning of said bars and moved into the path of said universal means.

19. In a printing telegraph receiver, a plurality of permutation bars, a plurality of magnets controlled by line current impulses for selectively releasing said bars in various combinations, a printing magnet, and means actuated by the printing magnet for permitting the released bars to move to their selecting positions in a number of given permutations and for effecting the printing operation upon the deenergization thereof.

20. In a printing telegraph receiver, the combination of a current distributor, a plurality of circuits connected thereto magnets in said circuits, a plurality of selecting bars one for each magnet and controlled thereby, a movable type carriage carrying the char-

acters, a plurality of code bars selectively controlled by the relative position of said selecting bars, and a printing magnet for allowing the selected code bar to become operative and for printing the desired character.

21. In a printing telegraph receiver, the combination of a current distributor, a plurality of circuits connected thereto, selecting and operation controlling magnets in said circuits, a plurality of selecting bars one for each selecting magnet and controlled thereby, a movable type carriage carrying a plurality of type levers, a plurality of spring tensioned code bars selectively controlled by the relative position of said selecting bars, and an electro-responsive device controlled by said operation controlling magnet and cooperating with said code bars and selecting bars to select the desired character to be printed.

22. In a printing telegraph receiver, a current distributor, a plurality of branch circuits connected thereto, type selecting magnets and an operation controlling relay in said branch circuits, a movable type basket carrying characters to be selected, an electromagnet under the control of said operation controlling relay for moving the type carriage, and an additional magnet likewise controlled by said operation controlling relay for printing the desired character.

23. In a printing telegraph receiver, a paper platen, a movable type carriage, means for moving said type carriage transversely of the platen in one direction step by step, electromagnetic means for controlling the return of the type carriage to normal position and for rotating the platen simultaneously, and means for effecting one of said last-mentioned operations independently of the other.

24. In a printing telegraph receiver, a rotatable paper platen, a movable type carriage, an electromagnet for moving said type carriage in one direction step by step, and a device controlled by a special group of impulses for permitting the return of the type carriage and for effecting rotation of the platen.

25. Printing telegraph apparatus comprising a rotatable platen, a traveling type carriage including a plurality of independently movable type levers, a rack, a worm gear cooperating with said rack for advancing the carriage, and a magnet controlled by line current impulses for effecting rotation of the platen and for withdrawing the rack from engagement with the worm gear to permit the return of said carriage.

26. Printing telegraph apparatus comprising a paper platen, a type carriage capable of movement transversely of said platen, a magnet for shifting the said platen, means for holding the platen in its shifted position, and a second magnet controlled by a special group of line current impulses for permitting the advance of said carriage and for releasing said holding means.

27. In a printing telegraph receiver, a plurality of selecting elements, an operating member individual to each of the elements, electromagnetic means for operating said members sequentially, a member common to said operating members for controlling the simultaneous movement of said selecting elements in accordance with the setting of the operating members, and electromagnetically operated means operated following the receipt of the selecting current units for supplying energy to operate said common member.

28. In a printing telegraph receiver, a plurality of selecting elements, an operating member individual to each of the elements, electromagnetic means for operating said members sequentially, a member common to said operating members for controlling the simultaneous movement of said selecting elements in accordance with the setting of the operating members, and electromagnetic means energized over a local circuit, said electromagnetic means itself operating said common member to permit the positioning of the selecting elements in various combinations.

29. In a printing telegraph receiver, a plurality of selecting elements, a plurality of electromagnets equal in number to the number of selecting elements, a latch corresponding to each of the electromagnets operative upon the deenergization thereof for conditioning the corresponding selecting element for operation, a bar common to said latches for positioning said selecting elements in accordance with the latches operated, and a sixth pulse electromagnet energized following the operation of said electromagnets for supplying the energy for operating said common bar.

In witness whereof, I hereunto subscribe my name this 24th day of July, A. D., 1918.

HARRY PFANNENSTIEHL.