March 5, 1940. E. E. KLEINSCHMIDT 2,192,353

PRINTING TELEGRAPH RECEIVER

Filed June 25, 1937 2 Sheets-Sheet 1

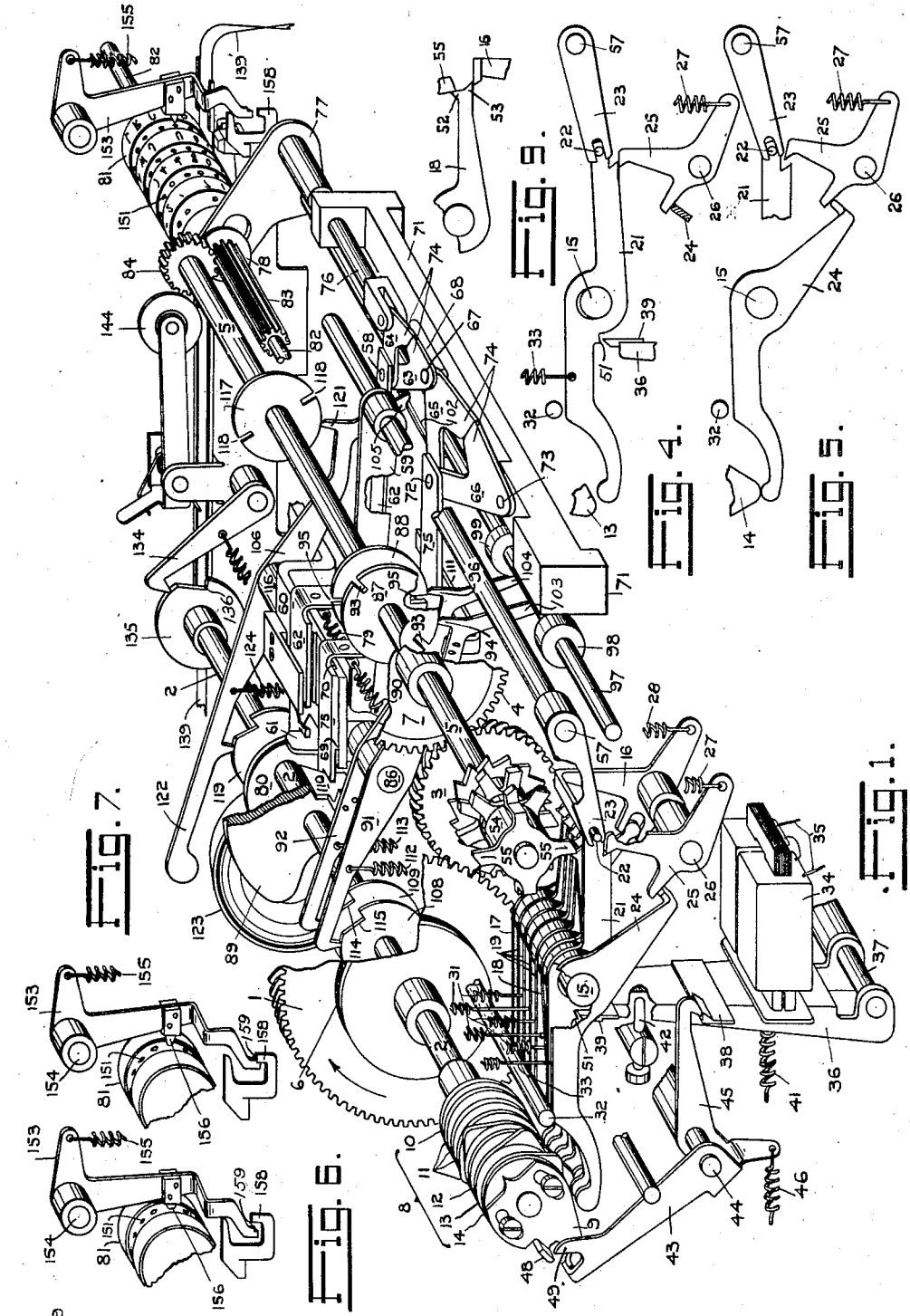


Fig. 7.

Fig. 1.

Fig. 9.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 10.

Fig. 11.

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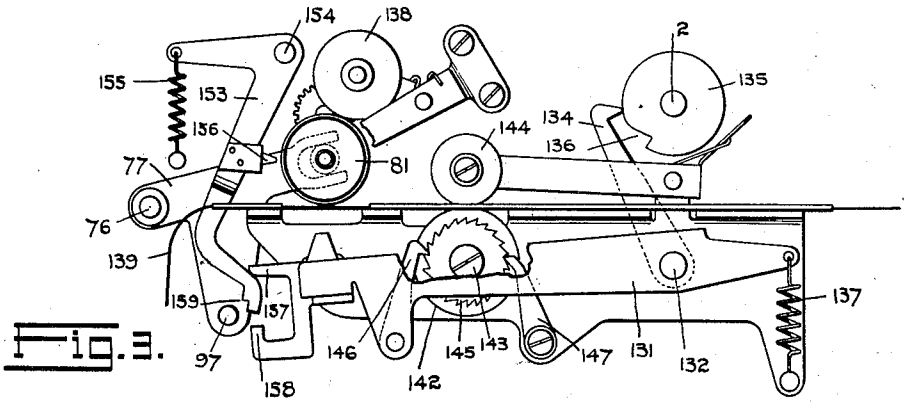


Fig. 3.

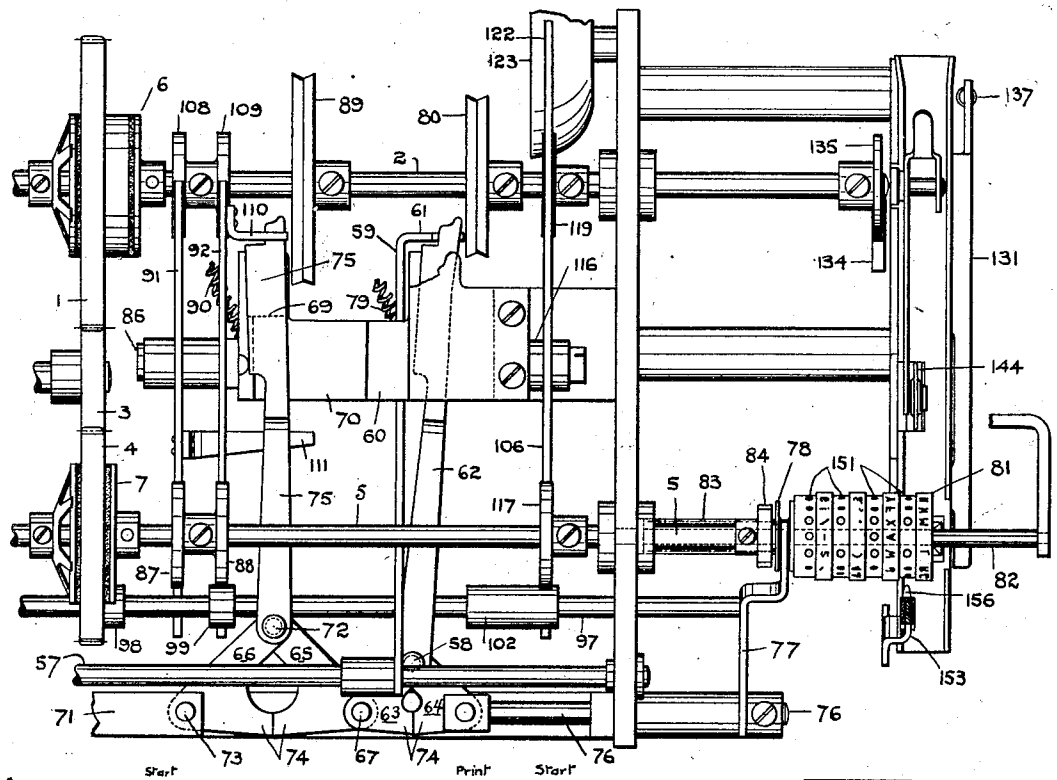


Fig. 2.

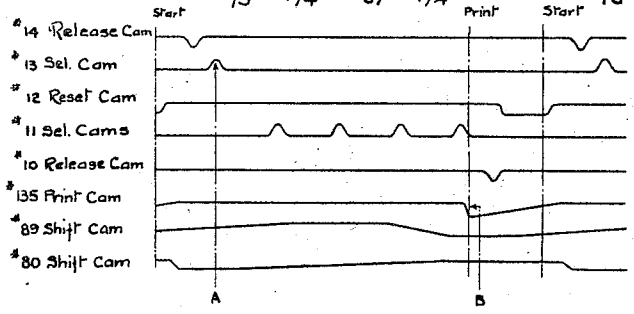


Fig. 8.

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UNITED STATES PATENT OFFICE

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PRINTING TELEGRAPH RECEIVER

Edward E. Kleinschmidt, Highland Park, Ill.

Application June 25, 1937, Serial No. 150,384

31 Claims. (Cl. 178—34)

This invention relates to telegraph receivers and in particular to the type operated by permutation code selecting mechanisms. The present disclosures are improvements applicable in particular to the inventions disclosed in my prior applications #18,888 and #95,883. These improvements are however applicable to other types of apparatus and it is intended that use of the inventions herein disclosed in other types of apparatus shall come within the scope of this application.

A principal object of my invention is to provide a novel telegraph receiver of the type operated by permutation code selecting mechanisms in which the typewheel carries a plurality of rows of type and wherein the selecting mechanism is operable to move the typewheel bodily as well as to rotate it in the selection of a character to be printed.

Another object of my invention is to provide a telegraph receiver of the type described in the preceding paragraph wherein the selecting mechanism is operable under the control of one of a plurality of code units to move the typewheel bodily a distance of one row of type and is further operable under the control of the remaining code units to rotate the typewheel to a desired rotary-position and/or to move the typewheel bodily a distance of two rows of type.

A further object of my invention is to provide in a telegraph receiver of the present type, a novel motion producing assembly operatively associated with a bodily movable typewheel carrying a plurality of spaced rows of type and operable under the control of a code selecting mechanism for moving the typewheel into any one of a plurality of positions corresponding to the rows of type thereon.

A still further object of my invention is to provide in a telegraph receiver of the present type, a novel typewheel and controlling means therefor wherein said typewheel is provided with a plurality of axially spaced rows of type, more than one of which are letters and more than one of which are figures and wherein the controlling means is operable to both move the typewheel bodily as well as to rotate it to thereby select the proper character from any one of the rows of type.

Another object of my invention is to provide a telegraph receiver of the present type, a novel selecting mechanism including a rotatable member arranged to drive a rotatable typewheel and carrying axially spaced stop means and also including means cooperable with said stop means to locate the typewheel in a desired rotary position and wherein said selecting mechanism completes a selecting cycle during one-half a turn of the rotatable member and the stop means.

A further object of my invention is to provide in a telegraph receiver of the present type a novel selecting mechanism including stop devices selectively pivotable about a plurality of pivots together with means operable under the control of the code units to select the pivot point of each stop device during a selecting operation.

Another object of my invention is to provide a novel telegraph receiver of the type operated by permutation code selecting mechanism wherein means are provided for registering the typewheel during printing and also for blocking printing during spacing and function operations.

More specifically it is an object of this invention to provide in a telegraph receiver of the type described in the preceding paragraph a novel combined registering and blocking mechanism which is cooperable directly with a rotatable and axially movable typewheel which functions to positively register the typewheel in any one of its selected axial or rotary positions during printing and which is further operable to block printing during a spacing or function operation.

Other objects will appear in the following description and in the appended claims:

Referring to the drawings,

Figure 1 shows the apparatus in perspective, all of the frame work being eliminated so as to show the parts more clearly.

Figure 2 is a plan view showing in particular the parts for shifting the typewheel.

Figure 3 is a side elevation showing the printing and blocking mechanism.

Figures 4 and 5 show the parts of the selector mechanism for shifting the typewheel axially.

Figures 6 and 7 show details of the combined registering and blocking mechanism.

Figure 8 is a timing chart.

Figure 9 is a detail of the normal stop lever.

Figure 10 is a detail of the figure shift cam.

Figure 11 is a detail of the first selection shi cam.

Referring now to Figures 1, 2 and 3, gear 1, loosely mounted on shaft 2, is rotated in a clockwise direction at a constant speed by a motor not shown, an idler gear 3 connects gear 1 with gear 4, also rotated in a clockwise direction and loosely mounted on shaft 5; gear 1 tends to rotate shaft 2 by a friction coupling 6, and gear 4 tends

to rotate shaft 5 by a friction coupling 7. Shaft 2 has fixed on it a cam assembly 8 and an orientable stop member 9. Cam assembly 8 consists of a latch release cam 10, four stop lever cams 11, a normal stop lever cam 12, typewheel shift lever cam 13, and release lever cam 14. Latch release lever 17 rotates on stud 15 and operates latch 16. Four stop levers 19 are mounted on stud 15 and each have an elongated bearing aperture which permits a slight lateral displacement as well as rotation on stud 15. Normal stop lever 18 rotates on stud 15. Typewheel shift lever 21, also mounted on stud 15, has an elongated bearing aperture the same as stop levers 19 and is connected by pin 22 to the bifurcated end of lever 23. Release lever 24 rotates on stud 15 and bears against latch 25. Latch 16 and latch 25 rotate on stud 26 and are held in their unoperated positions by springs 27 and 28. Springs 31 hold stop levers 19 against the lower part of stud 15 and stop 32. Spring 3 holds typewheel shift lever 21 against the lower part of stud 15 and stop 32. The relative positions of the cams are shown in the timing chart, Figure 8.

A receiving magnet 34 is connected by wires 35 in the circuit of a transmitter not shown. Armature lever 36 has a bearing on stud 37 and has attached to it latch plate 38 and fulcrum plate 39. Armature lever 36 when retracted by spring 41 rests against stop screw 42. A stop lever 43 pivoted on stud 44 lies in the path of stop member 9 and holds shaft 2 against rotation when they are in engagement. Stop lever 43 has an extension 45 that rests on latch plate 38 when armature lever 36 is unattracted, as shown in Figure 1. When armature lever 36 is attracted, spring 46 pulls extension 45 of stop lever 43 off latch plate 38 and stop lever 43 is disengaged from stop member 9, leaving shaft 2 free to rotate with gear 1 until lug 48 on stop member 9 engages with cam extension 49 of stop lever 43 to restore stop lever 43 to its normal position, as shown in Figure 1. Stop levers 19 and typewheel shift lever 21 are each provided with a bearing ledge 51. Stop levers 19 and normal stop lever 18 are each provided with stop extension 52 and latch extension 53, as shown in Figure 9. The upper end of latch 16 forms a bar which extends across and engages all of the latch extensions 53 of stop levers 19 and normal stop lever 18. The fingers of stopwheel 54 rotate in the path of stop extensions 52 of stop levers 19. Stopwheel 54 is fixed to shaft 5 and comprises four rows of stop fingers, each row of stops doubling in number over the previous row, the first row having two stops, the next 4, the next 8, and the last 16 stops. Two additional stops 55 are provided which engage with normal stop lever 18 in the normal stop position and hold shaft 5 against rotation, as shown in Figure 1. When armature lever 36 is moved against stop screw 42 it first releases stop lever 43 from engagement with orientable stop member 9, permitting shaft 2 and cam assembly 8 to rotate. Cam 13 thereupon operates typewheel shift lever 21 and thereafter the four cams 11 operate the four stop levers 19 in succession. If armature lever 36 remains against stop 42, levers 21 and 19 will pivot on latches 16 and 25, the elongated bearing aperture in the levers permitting them to move without rotation on stud 15. When, however, armature lever 36 is moved to the attracted position away from stop 42, after it has released stop lever 43, fulcrum 39 will be under bearing ledge 51 and if this happens when one of the stop levers 19 is operated by a cam 11, lever 19 will engage fulcrum plate 39 and pivot thereon, forcing its latch extension 53 to move latch 16 outwardly and in so doing latch 16 will release normal stop lever 18 permitting stop finger assembly 54 and shaft 5 to rotate. Stop extension 52 of the operated stop lever 19 will then be in the path of its row of stop fingers forming part of stopwheel 54 and will again stop shaft 5. The operated stop lever 19 will then become latched on latch 16 and remain there until the next stop lever 19 is operated which, when operated to fulcrum on fulcrum plate 39, will place its stop extension in the path of the stopwheel and release the previously set stop lever. Latch extension 53 will then rest on latch 16 and remain there until the next stop lever is operated to fulcrum on fulcrum plate 39 or until latch 16 is operated by latch release cam 10, which occurs at the end of the cycle as shown in the timing chart, Figure 8. By varying the operation of the four stop levers through the action of armature lever 36, stopwheel 54 and shaft 5 can be set in sixteen different positions including the normal stop position. The parts just described are the same and operate in the same manner as shown and described in my application #95,883 with the exception that in the present invention only four of the stop levers 19 control the positioning of stopwheel 54 and therefore 16 instead of 32 positions of the stopwheel are obtained and stopwheel 54 makes a maximum of one-half revolution during each selecting cycle. A more detailed explanation of the operation of stop levers 19 and stopwheel 54 is given in my applications #18,888 and #95,883. To obtain 32 selected positions during each selecting cycle, the first selection which is operated prior to the operation of stop levers 19 controls a shifting mechanism to shift the printing to a second row of type. This operation is controlled by the typewheel shift lever 21 and release lever 24.

As in my previous applications above referred to, it is intended to operate this telegraph receiver in circuit with a transmitter sending a no-current start impulse, five selecting impulses which may be either current or no-current according to the character transmitted, and a current stop condition. It is to be understood that this arrangement may be varied as desired and that the number of selecting impulses may be increased or reduced in accordance with the code to be used.

Typewheel shift lever 21 connects with shaft 57 through lever 23 which is fixed thereto, a lever 59 also fixed to shaft 57 has a cam extension 61 which is in engagement with shift bar 62 at one end thereof; the other end of shift bar 62 is connected by pin 58 to a pair of levers 63 and 64; lever 63 is connected to lever 65 by pin 67 which is guided in a slot 68 of frame 71. A further lever 66 is connected to lever 65 by a pin 72 and to frame 71 by pin 73. Each of the levers 63, 64, 65 and 66 is provided with projections 74 which abut when the levers are in the position shown in Figures 1 and 2. Levers 63, 64, 65 and 66 form the links of an aggregate motion assembly for shifting to different rows of printing. A figure shift bar 75, the operation of which will be later explained, is connected to levers 65 and 66 by pin 72. To lever 64 is attached shifting rod 76 which slides in frame 71 and has fixed to its outer end for 77 that engages with slotted hub 78 forming part of typewheel 81 which is rotatably and slidably mounted on stud 82. Also

fixed to typewheel 81 is a pinion 83 which meshes in a two to one ratio with gear 84 fixed to shaft 5 so that typewheel 81 will make one revolution when shaft 5 revolves through an arc of 180 degrees. Shift cam 80 fixed to shaft 2, shown in detail in Figure 11, engages shift bar 62 when it is moved into its path by cam extension 61. Shift bar 62 when operated spreads lever 63 and 64 to move shift rod 76 and typewheel 81 the space of one row of characters.

The operation of the shift is as follows:

The first selective signal of the code is used to control the operation of the typewheel shift and when this first signal is of a type which moves armature lever 36 away from stop 42, fulcrum plate 39 will be under bearing ledge 51 when lever 21 is operated by cam 13 and it will pivot on fulcrum plate 39, which is the selected operation of lever 21. Lever 21 will, through pin 22 operate lever 23 which rotates shaft 57, raising lever 59 so that cam 61 will move shift bar 62 into the path of shift cam 80 which thereupon engages shift bar 62, and moves it to spread levers 63 and 64 to shift typewheel 81 along stud 82 a space equal to one row of type. Cam 80 will hold typewheel 81 in the shifted position until after the printing operation, as shown at A and B in the timing chart, Figure 8. After the complete selecting and printing cycle but before the next engagement of cam 13 with lever 21, cam 14 operates release lever 24 to operate latch 25 and release lever 21 from its operated position, moving lever 23, lever 59 and cam extension 61 downward. If in the following code selection the first signal is of a type that will move armature lever 36 against stop 42, fulcrum plate 39 will be out of the path of bearing ledge 51 when lever 21 is operated and will not pivot thereon but pivot on the point of latch 25 which is the unselected operation of lever 21. Lever 23 and lever 59 will therefore remain in the downward position, shift bar 62 will be drawn out of the path of cam 80 by spring 79 and typewheel 81 will be moved back the space equal to one row of type by the action of spring 79.

Cams 13 and 14 are formed so that lever 24 is operated just before lever 21 is operated so that shift bar 62 is operated immediately after it is released when successive code combinations include the selected operation of lever 21.

Typewheel 81 has four rows of type, two adjacent rows are letters and two adjacent rows are figures. There are sixteen selective positions in the circumference, twenty-six letters are distributed over the two rows containing letters. The figures and punctuations are distributed over the other two rows. The selecting of any of the rotary positions of typewheel 81 and the shifting to an adjacent row have already been explained.

To shift the typewheel from letters to figures, or from figures to letters printing positions, figure shift bar 75 and cam 89 are provided. Shift bar 75 is shown in the letters shifted position in Figures 1 and 2 and it is held there by spring 90 which holds shift bar 75 rearward and sideways out of the path of cam 89 and holds levers 65 and 66 in the position shown in Figures 1 and 2. Two function levers 91 and 92, both mounted on stud 86, control the setting of shift bar 75 with relation to cam 89. The outer end of function lever 91 rests on the periphery of cam 108 attached to shaft 2 and having a notch 115 therein into which end of lever 91 is pulled by spring 112 when lever 91 is to be operated. Function lever 92 is provided with a similar spring 113 and its outer end rests on the periphery of cam 109, also fastened to shaft 2, and provided with notch 114 into which lever 92 is pulled when it is to be operated. Function lever 92 has a cam faced extension 110 attached to its side which engages with shift bar 75 to place it in the path of cam 89 when lever 92 is operated. Function lever 91 has an extension 111 attached to its side which lies under shift bar 75 and raises it to disengage ledge 69 from edge 70 of the depressed portion of plate 60 when function lever 91 is operated. When shift bar 75 is moved by cam 110 it drops into the recessed portion of plate 60, sliding therein when operated by cam 89 until it becomes latched by the engagement of ledge 69 with the outer edge 70 of plate 60. Spring 90 holds shift bar 75 in this position until function lever 91 operates and its extension 111 lifts shift bar 75 from engagement with the edge 70 of plate 60 whereupon spring 90 returns shift bar 75 to the position as shown in Figures 1 and 2.

Two function selecting discs 87 and 88 are fixed to shaft 5. Function selecting disc 87 is provided with two slots 93 into either of which extension 94 of function lever 91 is pulled when letters shift is to be operated. Function disc 88 is provided with two slots 95 into either of which extension 96 of function lever 92 is pulled when figures shift is to be operated.

To include the operation of the first selection, that is, the selective operation of lever 21, in the selection of a function such as figures shift, letters shift, or a signal, rod 97 is provided which is connected to fork 77. Rod 97 has collars 98, 99 and 102 attached to it which will, in shifting of typewheel 81 along stud 82, assume positions relative to extension 103 of lever 91 and extension 104 of lever 92, and extension 105 forming part of signal lever 106 either to permit or block their operation. In the arrangement of the parts as shown, both the letters shift and the figures shift include the selected operation of lever 21 and shift bar 62 will be operated whenever a shift function is to be selected, collar 99 will therefore be out of the path of extension 104 when the figure shift is selected.

When typewheel 81 is shifted to print from the first row of figures, collar 98 will block extension 103, but when it is set to print from the second row of figures, which includes the first selection and therefore the operation of lever 21, collar 98 will pass beyond and out of the path of extension 103 permitting lever 91 to operate the letters shift when that is selected.

To operate the figures shift, a combination of impulses comprising a no-current start impulse, two current impulses, a no-current impulse, two current impulses, and the normal current stop condition, is transmitted to magnet 34. The no-current start impulse will release armature lever 36 and permit stop lever 43 to release cam assembly 8 and shaft 2 which will then rotate with gear 1 in timed relation with the impulses to follow. Referring to Figure 1 and the timing chart, Figure 8, cam 12 first releases normal stop lever 18 which then comes to rest on latch 16. Thereafter cam 14 operates latch release lever 24 and operates latch 25 to release lever 21. The first current impulse will attract armature lever 36 and place fulcrum plate 39 under the ledge 51 of lever 21 whereupon cam 13 operates lever 21 which will fulcrum on fulcrum plate 39 to operate lever 23, turn shaft 57 and raise lever 59, pressing its cam extension 61 against the side of shift bar 62, moving it in the path of cam

80 until it is operated thereby. The operation of cam 80 on shift bar 62 carries on during the rest of the selecting cycle but is completed before a function or printing operation is started. The next impulse being also current, holds armature lever 36 attracted and the first cam 11 will operate the first stop lever 19 which will fulcrum on fulcrum plate 39. Latch extension 53 of the operated lever 19 will press latch 16 outward and permit normal stop lever 18 to drop by the action of its spring 31 thereby releasing stopwheel 54 which will then rotate through an arc of 90 degrees when one of the stop fingers in the first row of stopwheel 54 will engage with the operated stop lever 19. The next impulse received on magnet 34 being no-current will allow armature lever 36 to retract and when the next or second cam 11 operates the second stop lever 19, fulcrum plate 39 will be out of the path of bearing ledge 51, the operated stoplever 19 will fulcrum on latch 16 and no other operation takes place. The two following impulses being current will cause the remaining two stop levers 19 to fulcrum on fulcrum plate 39 in succession, each placing its stop extension in the path of the stop fingers of stopwheel 54, releasing the previously set stop levers, the first permitting the stopwheel to turn through an arc of 22½ degrees, and the last, through an arc of 11¼ degrees. Stopwheel shaft 5 and its attached parts will now have turned 123¾ degrees and shift bar 62 has moved rod 76, fork 77, typewheel 81, rod 97 and collar 99. Typewheel 81 is now set in position for printing from the second row of letters. However since the selection just described is for operating the figures shift, printing is blocked in a manner to be described later. One of the slots 95 of disc 88 will now be in alignment with extension 96 of function lever 92. After shaft 2 and its attached parts have revolved through an arc completing the operation of cams 11 on levers 19, notch 114 of cam 109 will be under function lever 92, and since extension 96 of lever 92 is now opposite slot 95, function lever 92 will be operated by its spring 113 and cam faced extension 110 will move shift bar 75 into the path of cam 89 which will move it to spread levers 66 and 65, the movement of figure shift bar 75 being completed during the next selecting cycle, as shown in timing chart, Figure 8.

Referring to Figures 1 and 2, signal lever 106 pivoted on stud 116 is provided, which cooperates with selector disc 117 attached to shaft 5 and having two slots 118, and a cam 119 attached to shaft 2 in the same manner as function levers 91 and 92. Signal lever 106 is provided with an extension 121 and a bell clapper extension 122 which strikes bell 123 when it is operated by spring 124. Extension 105 forming part of signal lever 106 lies in the path of collar 102 which permits operation of signal lever 106 when the selected function of stopwheel 54 places one of the slots 118 opposite extension 121 only in the fully shifted position of typewheel 81, that is, when both shift bars 75 and 62 have been operated.

Referring to Figures 1, 2 and 3, printing of a selected character is accomplished by print hammer 131 which is pivoted on shaft 132. A print control lever 134 also attached to shaft 132 rests on the periphery of cam 135 during the selecting operation and is pulled into notch 136 by spring 137. Notch 136 is so located on cam 135 that it operates print hammer 131 directly after the last cam 11 has operated the last stop lever 19. An inking roller 138 is provided to ink typewheel 81 in the usual manner. A paper tape 139 receives the impression from typewheel 81 when print hammer 131 is operated to print a character. Paper feed wheel 142 pivoted on bearing screw 143 and pressure roller 144 are provided to feed the tape between printing operations. A ratchet wheel 145 is attached to paper feed wheel 142. A feed pawl 146 is attached to print hammer 131 and rotates the ratchet one tooth for each printing operation and for the space operation. Retaining pawl 147 holds the ratchet in place between the operations of feed pawl 146. To register the typewheel when printing and to prevent printing when a function is to be operated, typewheel 81 is provided with holes 151 located alongside each row of characters, there being no such holes in the position corresponding to the positions of the typewheel that are selected when a function is to be operated except that when a spacing operation is selected a shallow hole is located in that selected position. A registering and print blocking lever 153 is pivoted on stud 154 and normally cammed outward by finger 157 forming a part of print hammer 131 to the position shown in Figure 3, against the tension of spring 155. A pin member 156 attached to lever 153 is pressed against the space between the rows of type of typewheel 81 and enters a hole 151 that registers with a selected character for each printing operation, thereby correcting the position of typewheel 81 with relation to print hammer 131. When print hammer 131 is operated and pin member 156 enters one of the holes that are set opposite it, finger 157 of print hammer 131 permits lever 153 to move out of the path of projection 158 to permit the full movement of print hammer 131 as shown in Figure 6. When, however, a function operation is selected and print hammer 131 is operated, pin member 156 will not enter a hole of the typewheel 81 but will strike the periphery thereof, permitting only a slight motion of lever 153, insufficient to place it out of the path of projection 158 which will then strike the end of lever 153 blocking the print lever 131 so that spacing and printing is prevented. When a spacing operation is selected, typewheel 81 will be positioned so that the shallow hole 151 will be opposite pin member 156, and when print hammer 131 is operated, pin member 156 enters the shallow hole and lever 153 will move to a point where the projection 158 will strike the recessed portion 159 of lever 153, permitting print hammer 131 to move a sufficient distance to cause feed pawl 146 to feed the paper feed wheel 142 one tooth, thereby spacing the paper, but preventing its striking the paper for printing as shown in Figure 7. It is obvious that the registering and print blocking lever 153 may be operated directly from a separate cam such as cam 135 in which case a lever similar to print control lever 134 would be attached to lever 153 to operate it; finger 157 on print hammer 131 would be removed.

It is to be understood that the foregoing described mechanisms are capable of a wide variety of applications other than those described herein by way of illustration and that the invention is not limited to the particular arrangements described and that considerable modification or rearrangement of the parts is possible without departing from the invention, and that the scope of the appended claims shall not be limited to the foregoing description but all changes which

come within the meaning and range of equivalency of the claims are intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A telegraph receiver comprising a type carrying member having a plurality of rows of type thereon, a permutation code selector having a plurality of selective operations, mechanical means controlled solely by the first selective operation of said code selector for shifting the printing position of said member to one of said rows of characters, and mechanical means controlled by all of the remaining selective operations of said code selector for positioning the printing position to one of the characters in a row.

2. A telegraph receiver comprising a rotatable type carrying member provided with a plurality of axially spaced rows of type, a permutation code selecting mechanism including mechanical means for setting said member in different rotary positions in accordance with the selective operation of all but one of the units of a code, and shifting means operated by mechanical means solely under the control of said one unit in the code for shifting said member to a selected row of type.

3. A telegraph receiver comprising a selecting mechanism, printing means including a typewheel provided with groups of type, a series of stops adapted to directly and progressively control said printing means, stop means controlled by said selecting mechanism for cooperation with said series of stops, and means operable by the selecting mechanism to control selection from one of said groups during the operation of the series of stops on the printing means.

4. A permutation code selecting mechanism for use with a rotatable typecarrying member provided with axially spaced rows of type comprising means for directly and progressively controlling the rotary position of said member in accordance with the selective operation of all but one of the units in a code, and means operable by said one unit to shift said member to another row of type.

5. In a telegraph receiver comprising a rotary typewheel having a plurality of rows of type and a drive shaft for said typewheel provided with stops in a series of rows which progressively double in number, a selecting mechanism operated by permutation code signals including means controlled by all but one of the code units for controlling the rotary position of the typewheel thru said stops and shift mechanism controlled by said one unit of the code for controlling the position of the typewheel as to the rows of type thereon.

6. In a telegraph receiver of the type wherein selection of characters is controlled by a permutation code selector, a selecting mechanism, a bodily movable type wheel carrying a plurality of rows of type, and a mechanical motion producing assembly including means selectively operable under the control of said selecting mechanism to move said type wheel so as to position any one of said rows of type in printing position, said motion producing assembly comprising means operable under the control of only one of the units of a code to move said type wheel a distance equal to one row of type and means operable under the control of all of the remaining units of the code to move said type wheel a distance equal to two rows of type.

7. In a selector mechanism, a plurality of selector members each arranged to pivot about a plurality of points, fulcrum means selectively positioned and responsive to successive signals to select the points about which said selector members pivot to effect selective positioning, means to operate said selector members in timed relation with said successive signals, means associated with the first one of said selector members for controlling the positioning of a typewheel to print from one of two rows of type thereon and means associated with the remainder of the selector members controlling the rotary positions of the typewheel.

8. A telegraph receiver comprising a typewheel, means to set the typewheel in different rotary positions, a print hammer cooperating with said typewheel, and registering means cooperating with the typewheel to accurately position same with respect to the print hammer when a character is to be printed, said registering means comprising a lever provided with an extension including a member that normally prevents the operation of the print hammer, but permits operation thereof when a character is to be printed.

9. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, permutation code selecting means to position the typewheel in accordance with received signals, a print hammer to cooperate with said typewheel, and combined registering means for the typewheel and blocking means for the print hammer comprising a lever cooperating with indentations in the typewheel to register the typewheel with respect to the print hammer when a character is to be printed and having a portion for engaging said print hammer to prevent operation of the print hammer at other times.

10. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, and a permutation code selecting mechanism to position the typewheel in accordance with received signals to different printing positions or non-printing positions, said typewheel being provided with registering means in the printing positions, a print hammer cooperating with the typewheel to print characters on a record paper, combined registering means for the typewheel and blocking means for the print hammer, comprising a lever having means to engage with the registering means on the periphery of the typewheel in the printing position thereof and to engage with the non-registering periphery of the typewheel in the non-printing position thereof, said lever also having means for engaging said print hammer to prevent complete operation thereof when said first named means is engaged with said non-registering periphery.

11. A telegraph receiver comprising a typewheel having a plurality of rows of type thereon, a permutation code selecting mechanism to set the typewheel in various rotary and axial printing and non-printing positions in accordance with the received signals, said typewheel provided with registering indentations for each printing position, a print hammer cooperating with said typewheel, register means for said typewheel comprising a member to engage with the indentations in the typewheel to register it both as to its rotary and axial position with relation to the print hammer, blocking means for the print hammer operated by the registering means to permit or prevent operation of the print hammer in accordance with the setting of the said typewheel.

12. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, and a permutation code selecting mechanism to position said typewheel in different rotary and axial positions, means comprising an aggregate motion device for shifting the typewheel axially including a member thereof to shift the typewheel a distance equal to one row of type under the control of one unit of the permutation code selecting mechanism and another member under the selective control of all units of the code to shift the typewheel a distance equal to two rows of type.

13. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, and a permutation code selecting mechanism to position said typewheel in different rotary and axial positions comprising an aggregate motion function control device for shifting the typewheel axially including a member thereof to shift the typewheel a distance equal to one row of type under the control of one unit of the permutation code selecting mechanism and another member of said aggregate motion mechanism operative under the selective control of all units of the code, to shift the typewheel a distance equal to two rows of type, and means operated by the shifting mechanism to permit or prevent the operation of function control means.

14. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, and a permutation code selecting mechanism including a cam unit rotating in timed relation with the received signals, to position said typewheel in different rotary and axial positions, an aggregate motion device for shifting the typewheel axially including one member thereof to shift the typewheel under the control of one unit of the permutation code selecting mechanism and another member of said aggregate motion mechanism operative under the selective control of all units of the code, to shift the typewheel a distance equal to two rows of type, and cam means for operating the aggregate motion mechanism connected to and rotating with the first mentioned cam unit.

15. In a telegraph receiver of the type wherein the selection of characters is controlled by a permutation code selector, a selecting mechanism, a typewheel provided with a plurality of axially spaced rows of letter type and a plurality of rows of figure type, said selecting mechanism comprising stop means for determining the rotary position of said typewheel, and shift devices selectively operable to axially position said typewheel for printing from any one of said rows of type.

16. In a telegraph receiver of the type described, a rotatable and axially movable typewheel provided with axially spaced rows of type, selecting mechanism including a plurality of rows of rotatable stops, means for driving said typewheel under the direct control of said stops, said driving means being arranged to rotate said typewheel at twice the rotary speed of said stop, and selecting devices in said selecting mechanism cooperable with said stops to position said typewheel at any one of all of its rotary positions during a half revolution of said stops.

17. A telegraph receiver comprising an axially movable and rotatable typewheel provided with a plurality of rows of type, a permutation code selecting mechanism including means for axially moving said typewheel, means for rotating said typewheel to a selected rotary position in accordance with the received code units, printing mechanism associated with said typewheel, and a registering means operable to hold said typewheel in selected position during printing and to block printing during spacing and function operations of said selecting mechanism.

18. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon and a permutation code selecting mechanism including a shaft that is rotated in timed relation with the received signals, said shaft carrying cams that operate stop means to position said typewheel in different rotary positions, operating means on the said shaft to directly position said typewheel axially, said operating means on said shaft comprising a member to shift the typewheel under the control of one unit of the permutation code selecting mechanism, and another member operative under the selective control of all units of the code to shift the typewheel a distance equal to two rows of type.

19. A telegraph receiver, in which the selection of characters is controlled by a permutation code selector, comprising, means controlled by one of the units of the code to shift the selection from one of two groups of characters, and stop means controlled by the remainder of the units for directly and progressively positioning a rotary stop member provided with rows of stops that progressively double in number for selecting a character from one of the groups.

20. A telegraph receiver in which the selection of characters is controlled by a permutation code selector comprising a magnet, a rotary stop member having rows of stops thereon that progressively double in number as to the rows, stop means operable under the control of said magnet for directly and progressively positioning said rotary stop member in accordance with all but the first unit of a code signal to select characters in groups of two, and means under the control of said magnet and independent of the rotary stop member to select from one of two characters of said group in accordance with the first unit of the code signal.

21. In a printing telegraph receiver, a typewheel having a plurality of rows of type, a permutation code selecting mechanism operable to control the rotary position of said typewheel, means actuated by said selecting mechanism for axially positioning said typewheel to bring one of said rows of type into a printing position, a printing member, and means associated with said member for registering said typewheel, said last-named means being also operable to block printing when said selecting mechanism is set to actuate said first-named means for axially positioning said typewheel.

22. In a printing receiver, a typewheel having a plurality of rows of type thereon, a permutation code selecting mechanism operable to position said typewheel in different rotary positions, means comprising an aggregate motion device controlled by said selecting mechanism for shifting said typewheel axially, said aggregate motion device including a member operable to shift the typewheel a distance equal to one row of type under the control of one unit of the selecting mechanism and another member operable to shift the typewheel a distance equal to two rows of type under the control of all units of said selecting mechanism, a printing mechanism, and means associated with said printing mechanism for registering said typewheel in any one of its selected positions, said registering means also being operable to prevent operation of said print-

ing mechanism when said typewheel is to be moved axially by said motion device.

23. A printing telegraph receiver comprising, a typewheel having a plurality of axially spaced rows of characters thereon, a code selecting mechanism for setting said typewheel in any one of a plurality of rotary positions, means for moving said typewheel axially to bring a selected row of characters into printing position, a print hammer cooperating with said typewheel, a combined registering and blocking means operable to register said typewheel in a selected rotary and axial position for printing or function operations of said selecting mechanism, said last-named means including a member for preventing operation of said print hammer when a function operation is selected by said selecting mechanism.

24. A printing telegraph receiver comprising a typewheel having a plurality of rows of type thereon, said typewheel also being provided with peripheral portions adjacent to said rows of type, a permutation code selecting mechanism for positioning said typewheel in accordance with received signals in different printing or non-printing positions, said selecting mechanism including means for selectively rotating said typewheel and means for selectively moving said typewheel axially, said typewheel peripheral portions being provided with registering means corresponding to printing positions, and non-registering parts, a print hammer cooperating with said typewheel to print characters on a record paper, combined registering means for the typewheel and blocking means for said print hammer, comprising a lever to engage with said registering means in printing position thereof to permit operation of said print hammer, said lever also being engageable with the non-registering parts of said peripheral portions of said typewheel in non-printing positions thereof to prevent complete operation of said hammer.

25. A printing telegraph receiver comprising a rotatable and axially movable typewheel having a plurality of axially spaced rows of type thereon, said typewheel being also provided with peripheral portions adjacent to said rows of type, registering and non-registering parts on said peripheral portions, a permutation code selecting mechanism, said selecting mechanism including a series of stops for controlling the rotary position of said typewheel and means comprising an aggregate motion device for shifting said typewheel axially, said aggregate motion device being operable under the control of one unit of the code selecting mechanism to move the typewheel a distance equal to one row of type and operable under the control of all units of the code selecting mechanism to shift the typewheel a distance equal to a plurality of rows of type, a print hammer cooperable with the typewheel, combined registering means for said typewheel and blocking means for said hammer, comprising a lever to engage with a registering part on said peripheral portions of said typewheel to permit operation of said hammer when said typewheel is in a printing position, said lever also being engageable with the non-registering portions of said peripheral portions to prevent operation of said hammer when said typewheel is in a non-printing position for the performance of spacing or the shifting of said typewheel axially by said aggregate motion device.

26. A telegraph receiver comprising a type wheel having a plurality of rows of type thereon; means for axially shifting said typewheel to select a given row of characters; means for rotating said typewheel, always in the same direction, to select a character from said row; and a permutation code selector mechanism for controlling the operation of both of said means during a single selecting operation thereof.

27. A telegraph receiver comprising a type wheel having a plurality of rows of type thereon; a permutation code selector; means for rotating said typewheel, always in the same direction; stop means, controlled by said selector in accordance with all of the units of a code signal, for determining the rotary position of said type wheel; and shift means for axially positioning said member as to the rows of type thereon, said shift means being controlled by said selector in accordance with one of the units of said signal, whereby the rotary and axial position of said member is set by a single selecting operation.

28. In combination, case shift mechanism; a plurality of selector members each arranged to pivot about a plurality of points, combined fulcrum selecting means to determine the points about which said selector members pivot, and means under the control of one of said selector members to operate said case shift means.

29. In a printing telegraph receiver; a case shift mechanism; a selecting mechanism, comprising a plurality of selector members each arranged to pivot about a plurality of points; combined fulcrum and selecting means to determine the points about which said selector members pivot; and means under the control of one of said selector members for operating said case shift mechanism.

30. A telegraph receiver comprising, recording means; a permutation code selecting mechanism responsive to a series of successive selective impulses for controlling the stop positions of said recording means; said selecting mechanism including means under the control of the first selective impulse for positioning said recording means independently of, and during the operating time of, the remaining selective impulses.

31. A telegraph receiver comprising recording means and a permutation code selecting mechanism responsive to a series of successive selective impulses; said selecting mechanism including means for controlling the stop positions of said recording means and means under the control of one of said selective impulses for positioning said recording means independently of, and during the operating time of, the remaining selective impulses.

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