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TELEGRAPH SYSTEM

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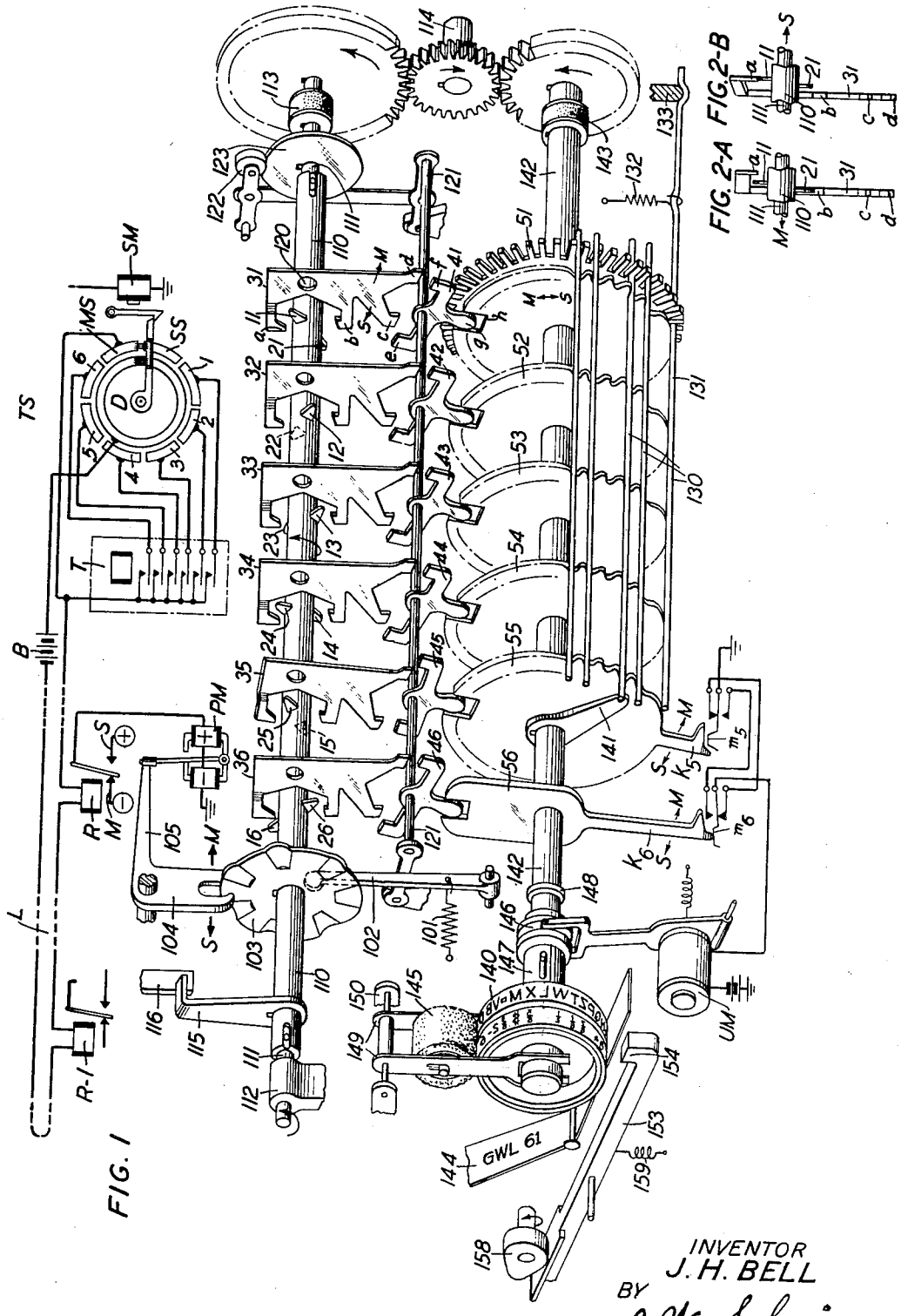

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TELEGRAPH SYSTEM

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This invention relates to telegraph systems and more particularly to telegraph systems including recorders embodying a character type carrier having the types arranged in two groups.

It has been usual to arrange the character types in different alignments on the type carrier, as in an upper and a lower case, and with the usual five-unit code it has been necessary to transmit a special shift signal for the alignment of the characters in a single line on the printing surface. However, in certain instances, as for examples, in the case of quotation service, the shift from one case to the other occurs so frequently that the loss of line time due to the shift signals is considerable.

It has been proposed to adapt a six-unit code for quotation service, whereby special shift signals would be eliminated with a considerable saving of line time. With such an arrangement it is possible to utilize a single six-unit signal combination for not only selecting a position of the type carrier but also to cause the proper shifting operations in accordance with the case of the transmitted character.

It is an object of the invention to utilize a signal code for the selection of any one of a plurality of character types arranged in two groups on the type carrier of a recording device and at the same time for initiating the shift operations in accordance with the similarity or dissimilarity of two of the signal units in a series of impulses comprising a code signal.

Another object of the invention is the printing of characters arranged in upper and lower case on the type wheel in a single line in response to a six-unit code, and the relative shifting of type carrier and printing surface in response to a difference or similarity between the settings of two members of two permutation units in a recorder.

In accordance with the invention, a telegraph printer when adapted for operation by a six-unit code may have a type wheel with as many as 64 different types arranged in two rows on its periphery corresponding to the upper and lower cases, the types being paired so that the type wheel may be positioned in 32 different printing positions responsive to the setting of five units of the selecting mechanism; the sixth unit of the selecting mechanism operates jointly with one of the five units to close circuit contacts for the electromagnetically operated shifting mechanism, the contacts being so interconnected that the placing of both of these two units either in marking or in spacing position will cause printing in one case, say the upper case, whereas the placing of these two units one in spacing and the other in marking position, will result in printing in the other case.

The invention in its preferred form will be described in connection with the attached drawing in which:

Fig. 1 is a schematic representation of a quotation service system of the start-stop type having a common transmitting station and a line including a plurality of receiving stations, and showing in a simplified exploded view only enough of a six-unit recording device for an understanding of the invention;

Figs. 2—A and B are views showing the relations between certain elements of a selecting unit of the recording device under marking and spacing conditions, respectively, viewed from the rear of the machine as shown in Fig. 1.

Inasmuch as the details of the general selecting mechanism shown in the drawing do not form a part of the invention, it is believed to be sufficient for a clear understanding of the invention and its operation to describe the operation of this mechanism in conjunction with the detailed description of parts and operations more closely related to the invention.

Referring now to Fig. 1, the line L includes a plurality of receiving relays R, R—1, etc. and a transmitting station TS. The transmitting station TS includes a transmitter T of any known type arranged for a six-unit code, having six transmitting contacts included in the line circuit through a transmitting distributor D of the start-stop type. The line circuit forms a closed loop connecting battery B through the segments of distributor D, contacts of transmitter T, the windings in series of all the relays R. When the distributor D is in its stop position, as shown, this loop circuit is closed by the brush arm bridging the common ring and the marking segment MS and all the receiving relays are operated to marking position. Transmission is started whenever a circuit (not shown) is closed in a known manner by the operation of the start magnet SM which releases the brush arm of the distributor. Upon leaving its normal position, the brush arm passes over the spacing segment SS, whereby a spacing signal is transmitted over the loop causing all the receiving relays to release to spacing position. The brush arm thereafter passes over segments 1, 2, 3, 4, 5 and 6 in succession causing the receiving relays to operate in accordance with the combination of open and closed contacts set up in the transmit-

ter T. The brush arm finally comes to a stop on the marking segment MS, again closing the loop circuit and thus completing the transmission of a character.

Referring now to the reception of such a series of permutation signals by any one of the receiving stations the operation of receiving relay R is transferred to a polarized printer magnet PM which controls all the operations of the printing device for the selection of a desired character and for the printing in a single line of the characters arranged in upper and lower cases.

With the printer magnet PM in the marking position as shown, a spring 101, exerting a pull on pivoted lever 102, applies a pressure to the left on a flutter disk 103 which in turn causes the horizontal arm 105 of the flutter lever 104 to rest against the armature of the printing magnet PM. When the first spacing signal is received, the armature of printing magnet PM goes to the right, thereby removing the stop for the arm 105. The flutter disc 103 is fixedly mounted on a cam drum 110 which forms a sleeve slidably mounted on the selector shaft 111, but arranged to rotate with the shaft; thus in response to the operation of the printer magnet PM the flutter disc 103 and with it the cam drum 110, moves a distance to the left under the pressure of spring 101 until the left-hand end of the cam drum engages the fixed stop 112.

The selector shaft 111 is intermittently driven in a direction shown by the arrow at its right-hand end through a friction coupling 113 and proper gearing from a constantly revolving motor shaft 114 connected to a motor (not shown); however, the shaft is prevented from rotating by a stop arm 115 fastened to the cam drum 110 and the free end of which engages a fixed stop 116; when as described, the cam drum 110 moves to the left, the stop arm 115 disengages the stop 116, thus permitting the rotation of shaft 111 and cam drum 110.

The flutter disc 103 has along its periphery a series of corrugations, seven in number, for the purpose of fluttering the lever 104 seven times as the disc makes one revolution, thereby causing the horizontal arm 105 of flutter lever 104 to move up and down; however, when due to the signals the armature of the printer magnet PM moves to the left, the downward movement of the arm 105 is prevented and the lever 104 causes the cam drum 110 to flutter in an axial direction on the selector shaft 111 due to the interaction between the corrugations in the flutter disc and the prongs at the lower end of the lever 104. The speed of rotation of the selector shaft 111 is timed so that each of the seven raised portions or corrugations of the flutter wheel will raise arm 105 once for each unit impulse received over the loop circuit with the result that each marking pulse in a signal combination will place the cam drum 110 towards the right for the time of its duration, whereas each spacing pulse will place the cam drum towards the left for the time of its duration. Thus as the cam drum 110 makes one revolution it will pass through seven periods corresponding to the duration of seven-unit impulses and in each period it will be either to the right or to the left, depending on whether the corresponding unit pulse is a marking or a spacing pulse, respectively. Upon the completion of the transmission of an impulse series, the cam drum will have completed a revolution and, due to the marking signal then being placed on the line, the cam drum will move to the right in time for the stop arm 115 to engage the stop 116 thereby bringing the cam drum 110 to a stop.

This fluttering operation of the cam drum 110 during a revolution in unison with the received signal pulses is effective in storing up a setting on the selecting or permutation mechanism in the printer in accordance with the impulse combination transmitter. For this purpose, the cam drum 110 carries six pairs of camming lugs, namely, spacing lugs 11 to 16 and marking lugs 21 to 26, the pairs of lugs being angularly and progressively displaced with respect to each other at a spacing corresponding to the angular spacing of the corrugations in flutter disc 103. Each pair of camming lugs is furthermore aligned in the axial direction with selector levers 31 to 36, which in turn cooperate with transfer levers 41 to 46 for the setting of code discs 51 to 56. The setting of the code discs from the movements of cam drum 110 will be described only in connection with the first permutation unit, shown at the extreme right, which is responsive to the first impulse of a signal combination received from the line, since the operation for setting the other code discs is the same. In this description reference will also be made to Figs. 2—A and 2—B which illustrate a portion of the cam drum 110 with the camming lugs 11 and 21 of the first unit and their cooperation with the associated selector lever 31 in the marking and spacing positions respectively of the cam drum 110. The spacing lug 11 is placed diametrically opposite marking lug 21 on cam drum 110, but these lugs are axially displaced a small distance. The selector lever 31 has a spacing projection *a* aligned with the lug 11 when the cam drum is in the spacing position and a marking projection *b* aligned with the lug 21 when the cam drum 110 is in marking position; the spacing lug 11 will clear both projections *a* and *b* in marking position and marking lug 21 will clear both projections *a* and *b* in the spacing position of the cam drum. The lugs are shaped to exert a camming action on these projections to impart a small angular movement to the selector lever 31 about its pivot point 120 whereby two other projections *c* and *d* on the selector lever 31 are caused to take one of two positions. The projections *c* and *d* cooperate with projections *e* and *f* respectively of the transfer lever 41 in such a manner that, in the case of marking, the projection *d* is aligned with projection *f* and projection *c* is out of alignment with projection *e*, whereas, in the case of spacing, projection *c* is aligned with projection *e* and projection *d* is out of alignment with projection *f*. The transfer lever 41 is hinged on a bail 121 which may be raised and lowered through the roller 122 from cam 123 mounted on the selector shaft 111; the transfer lever 41 has a projection *g* fitted in a slot *h* cut into the periphery of the code disc 51 for placing the disc in one of two angular positions, the disc being rotatable about the shaft 142.

During a complete revolution of cam drum 110 the pairs of camming lugs will pass in succession before corresponding projections on the selector levers and due to the fluttering of the drum in response to received signals the lugs will operate the selector levers into their marking or spacing positions in accordance with the signals received. Shortly before the completion of the revolution, the projection on cam 123 will raise the roller 122 for an instant thereby raising the bail 121 carrying all the transfer levers 41 to 46. With selector lever 31 in marking position, as shown in Fig. 1, the projection *d* will be in the

upward path of projection *f* of the transfer lever 41, thereby imparting a small angular displacement to the transfer lever, which in turn places the code disc 51 in its marking position; with the selector lever 31 in spacing position the projection *c* would be in the path of projection *e* of the transfer lever thereby placing the code disc in its spacing position. In this manner all the code discs 51 to 56 are adjusted to their spacing or marking positions in accordance with a received signal combination.

Each of the code discs 51 to 56 has a plurality of notches cut into its periphery, and the arrangement of these notches is different in all the discs so that any one of a plurality of stop pins 130 may be selected by corresponding settings of these discs for positioning of the type wheel 140. As shown for one of the stop pins 130 these pins comprise a straight portion 131 which is forced into engagement with the notched periphery of all the code discs by means of a spring 132. The other end of the pin 130 is pivoted at 133.

For each setting of the discs one of the stop pins 130 will be admitted to its inward position, due to the alignment of the notches associated therewith in the code discs, while all the other stop pins will be held in their outward position by a raised portion of at least one of the code discs. The selected stop pin thus enters into the path of the type wheel stop arm 141 which, together with type wheel 140, is mounted on the type wheel shaft 142 driven through friction clutch 143 and gearing from motor shaft 114. The same setting of the code discs, which caused the selective operation of the stop pin 130 referred to, is also instrumental in releasing the stop arm 141 from its previous position in engagement with another stop pin 130, which is forced into its outer position by the camming action of one or more of the notches. The stopping of arm 141 by engagement with the stop pin 130 places a pair of types on the type wheel 140 corresponding to the received signal in alignment with the platen 154 on the printing hammer 153 for printing.

In accordance with the invention, the sixth selecting unit associated with the cam drum 110 is made to operate a special code disc 56 which does not cooperate in the selection of stop pins but is arranged to cooperate with the code disc 55 for the control of the shift mechanism. For this purpose the discs 55 and 56 are provided with projections k_5 and k_6 respectively for operation of two sets of contact springs m_5 and m_6 which each comprise alternate contacts for completing a circuit from battery through the shift magent UM through the contact sets in series to ground.

The type wheel 140 is mounted on a sleeve 147 axially adjustable on the shaft 142 for positioning of the type wheel in upper or lower case under the control of the shift magnet UM, the armature of which has a fork at its upper end which fits into an annular groove 146 on the sleeve 147. Thus when the shift magnet UM is deenergized, the spring on its armature forces the sleeve 147 towards the right against the stop 148 on the type wheel shaft 142 thereby placing the lower case character types on the type wheel 140 in alignment with the platen 154 for printing; whereas when the shift magnet UM is energized its armature forces the sleeve 147 towards the left for alignment of the upper case character types with the platen 154. Inking roller 145 is placed in engagement with the type wheel 140 and is made to follow the axial movements of the type wheel by being mounted in a cradle 149 which in turn may be slidably connected to the frame 150 to prevent the roller from revolving about the type wheel. A printing tape 144 passes between the type wheel 140 and platen 154 in the usual manner.

From inspection of the drawing, it may readily be seen that the connections through the contact combinations m_5 and m_6 are so arranged that when the discs 55 and 56 are in spacing and marking positions respectively, as shown in the drawing, or inversely are in marking and spacing position respectively, the shift magnet UM will be energized to place the type wheel in the upper case, whereas when discs 55 and 56 both are either in marking or in spacing position the shift magnet UM will be deenergized and the type wheel 140 will be placed in the lower case. The shift operation takes place immediately upon the operation of the bail 121 after the reception of a complete signal combination. A printing cam 158 is arranged to be driven in unison with the selector shift 111 by means (not shown) and to force the printing platen 154 into engagement with the printing tape 144 and the type wheel 140 against the tension of spring 159 once for each revolution of the shaft 111, the time of its operation being such that it will take place shortly after the type wheel has been positioned for printing.

It should be understood that it is possible to arrange several modifications of the invention and to combine the features illustrated and described in different ways other than those disclosed without a departure from the scope of the invention.

What is claimed is:

1. A telegraph printer comprising two groups of types, means responsive to a combination of received impulses for selectively setting two types for printing, one from each group, and means for selecting the group from which a character is to be printed, characterized in this that said last mentioned means is responsive to the similarity or dissimilarity of two impulses of said combination of received impulses.

2. A method of signaling by permutated impulses in code series which comprises the signaling of a code series of alternative impulses representing two symbols, setting two characters corresponding to said two symbols for recording in response to said code series, and distinguishing between the two characters by the similar and alternate nature of two of the impulses of said code series.

3. A method of telegraph signaling which comprises transmitting a series of alternative impulses forming a code representing two characters, transmitting an extra impulse with said series and recording one of said two characters in accordance with the similarity and dissimilarity of said extra impulse and an impulse of said series.

4. A telegraph recording device comprising a type carrier with types arranged in pairs, a plurality of permutation units for the selection of a pair of types, instrumentalities associated with said type carrier for the recording of either type of a pair and control means associated with each of two of said permutation units and interconnected to cooperate in the control of said instrumentalities in accordance with the similarity or dissimilarity of the selected positions of said two

permutation units for recording one or the other type, respectively, of a pair.

5. A character recording device responsive to permutated character signals from a line circuit for printing in a single alignment of characters arranged in upper and lower cases without separate shift signals, which comprises a rotating type carrier having two groups of types, electromagnetic means for shifting said type carrier into printing position for one or the other of said groups, circuit changing contacts operative in response to two impulse units of a character signal received by said recording device from said line for control of said electromagnetic means.

6. A character recording device responsive to a six-unit code, a rotating type carrier, a plurality of character types on said carrier arranged in two different groups, electromagnetic means for shifting said type carrier for printing in either group, six selecting units each responsive to a unit impulse of a signal, contacting means arranged to cooperate with two of said selecting units and connected to control the shifting of said type carrier by said electromagnetic means.

7. A character recording device responsive to a six unit code comprising a rotating type carrier, a plurality of character types on said carrier arranged in two different groups, a tape for receiving type imprints of said type in a single line, electromagnetic means for controlling the relative positions of said type carrier and said tape for printing in either group of said types, six selecting units each responsive to a unit of said code, contacting means arranged to cooperate with two of said selecting units and connected to said electromagnetic means to control the relative positions of said tape and said type carrier.

8. A character recording device comprising a receiving distributor, a permutation mechanism associated therewith, a rotating type carrier positioned in accordance with the setting of said permutation mechanism, a plurality of types arranged in two groups on said type carrier, a tape for receiving type imprints from either of said groups of type, and electromagnetic means associated with said permutation mechanism for controlling the relative position of said type carrier and tape in accordance with the similarity or difference in the setting of two units of said permutation mechanism.

9. A character recording device in accordance with claim 8 wherein said electromagnetic means shifts the axial position of said type carrier for printing types of either groups of types in a straight line.

10. A character recording device in accordance with claim 8 characterized in this that the selection of one of the two groups of types for printing is made by axially shifting said type carrier by said electromagnetic means in accordance with the similarity or difference in setting of two of said permutation units.

11. In a telegraph printer responsive to multi-unit permutation code signals having two printing cases, electromagnetic means for selecting the desired case in response to the similarity or difference of two units of said multi-unit code.

12. A telegraph recording device responsive to a six-unit telegraph signal comprising a rotary type carrier, a plurality of types arranged in two rows around the periphery of said type carrier, means for recording and storing said six-unit telegraph signal on a set of six permutation units, means for selecting two of said types, one being in each row in accordance with the setting of five of said permutation units, contact springs associated with the fifth and sixth permutation units, an electromagnet connected thereto for shifting said type carrier whereby the desired type of said two types is selected in accordance with the similarity or difference in the setting of said fifth and sixth permutation units, a tape adapted to receive the imprint of said type and means for printing the selected type in the selected row upon said tape.

13. In a character recording device responsive to multi-unit telegraph signals having a multi-unit type selecting mechanism and a rotary type wheel with the type arranged in two rows around its periphery, means for shifting either of said rows of type into the printing position comprising a source of electric current, an electromagnet connected thereto, an armature associated with said electromagnet adapted to shift said type wheel, a plurality of contacts associated with said type selecting mechanism and means for connecting said contacts to said electromagnet, whereby said electromagnet will shift said type wheel in accordance with the settings of two units of said mechanism for any type selection.

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