

Dec. 24, 1940.

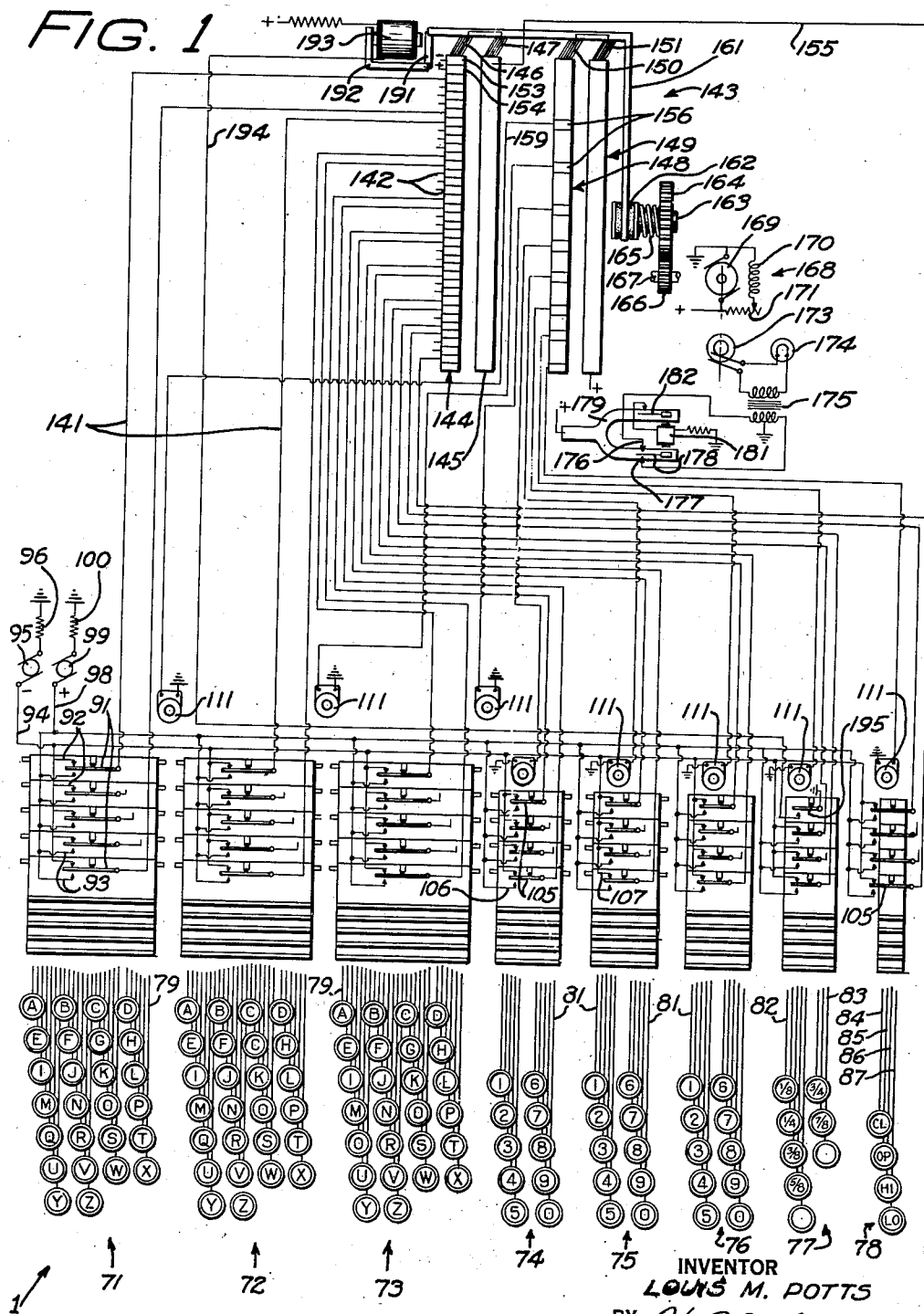
L. M. POTTS

2,225,657

TELEGRAPH MESSAGE CLASSIFICATION SYSTEM

Original Filed Jan. 17, 1929

5 Sheets-Sheet 1



Dec. 24, 1940.

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2,225,657

TELEGRAPH MESSAGE CLASSIFICATION SYSTEM

Original Filed Jan. 17, 1929

5 Sheets-Sheet 2

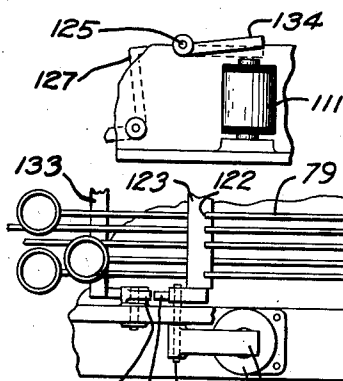


FIG. 4

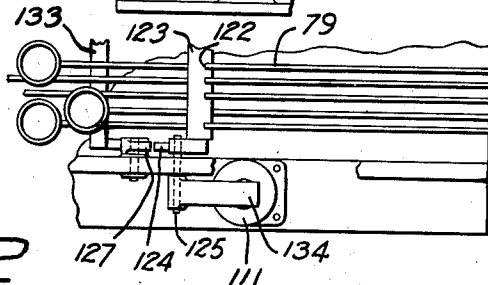


FIG. 5

FIG. 2

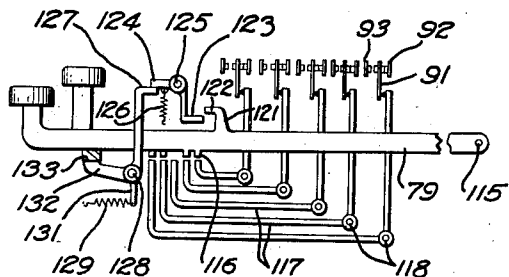


FIG. 3

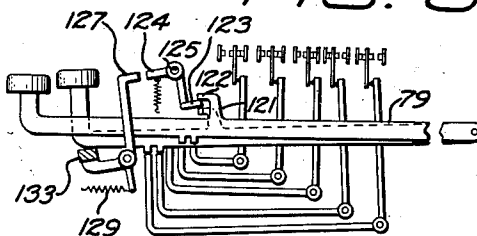


FIG. 6

A	000000	000000	000000	1	000000	000000	000000		
B	000000	000000	000000	2	000000	000000	000000		
C	000000	000000	000000	3	000000	000000	000000		
D	000000	000000	000000	4	000000	000000	000000		
E	000000	000000	000000	5	000000	000000	000000		
F	000000	000000	000000	6	000000	000000	000000		
G	000000	000000	000000	7	000000	000000	000000		
H	000000	000000	000000	8	000000	000000	000000		
I	000000	000000	000000	9	000000	000000	000000		
J	000000	000000	000000	0	000000	000000	000000		
K	000000	000000	000000		000000	000000	000000		
L	000000	000000	000000						
M	000000	000000	000000	1/8				000000	
N	000000	000000	000000	1/4				000000	
O	000000	000000	000000	3/8				000000	
P	000000	000000	000000	1/2				000000	
Q	000000	000000	000000	5/8				000000	
R	000000	000000	000000	3/4				000000	
S	000000	000000	000000	7/8				000000	
T	000000	000000	000000					000000	
U	000000	000000	000000					000000	
V	000000	000000	000000					000000	
W	000000	000000	000000	CL				000000	
X	000000	000000	000000	OP				000000	
Y	000000	000000	000000	HI				000000	
Z	000000	000000	000000	LO				000000	

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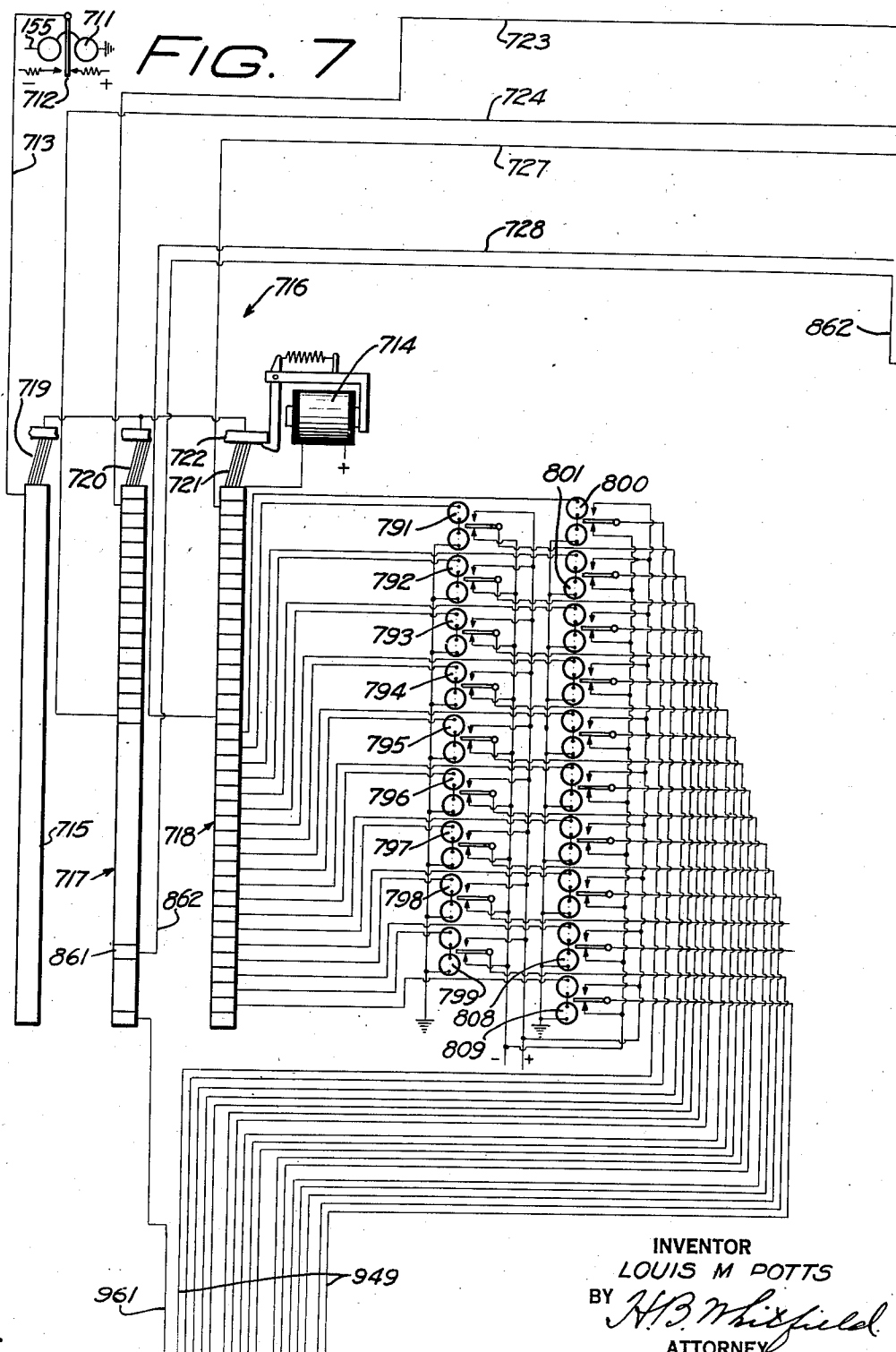
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5 Sheets-Sheet 3



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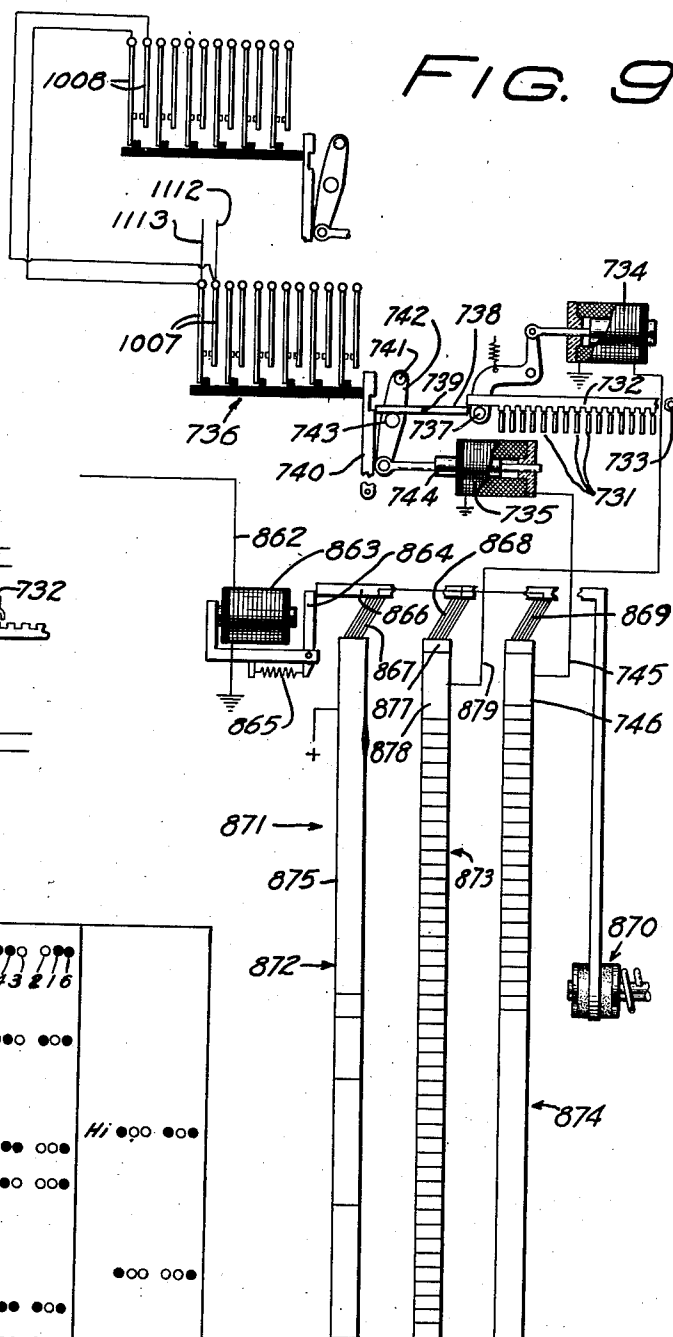
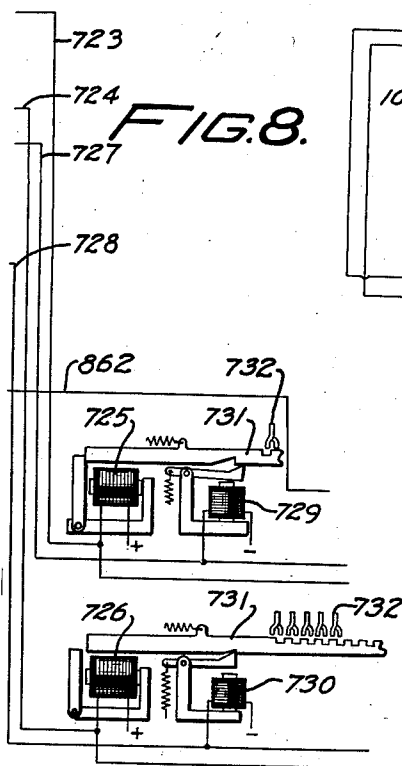
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TELEGRAPH MESSAGE CLASSIFICATION SYSTEM

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5 Sheets-Sheet 4

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TELEGRAPH MESSAGE CLASSIFICATION SYSTEM

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5 Sheets-Sheet 5

FIG. 10

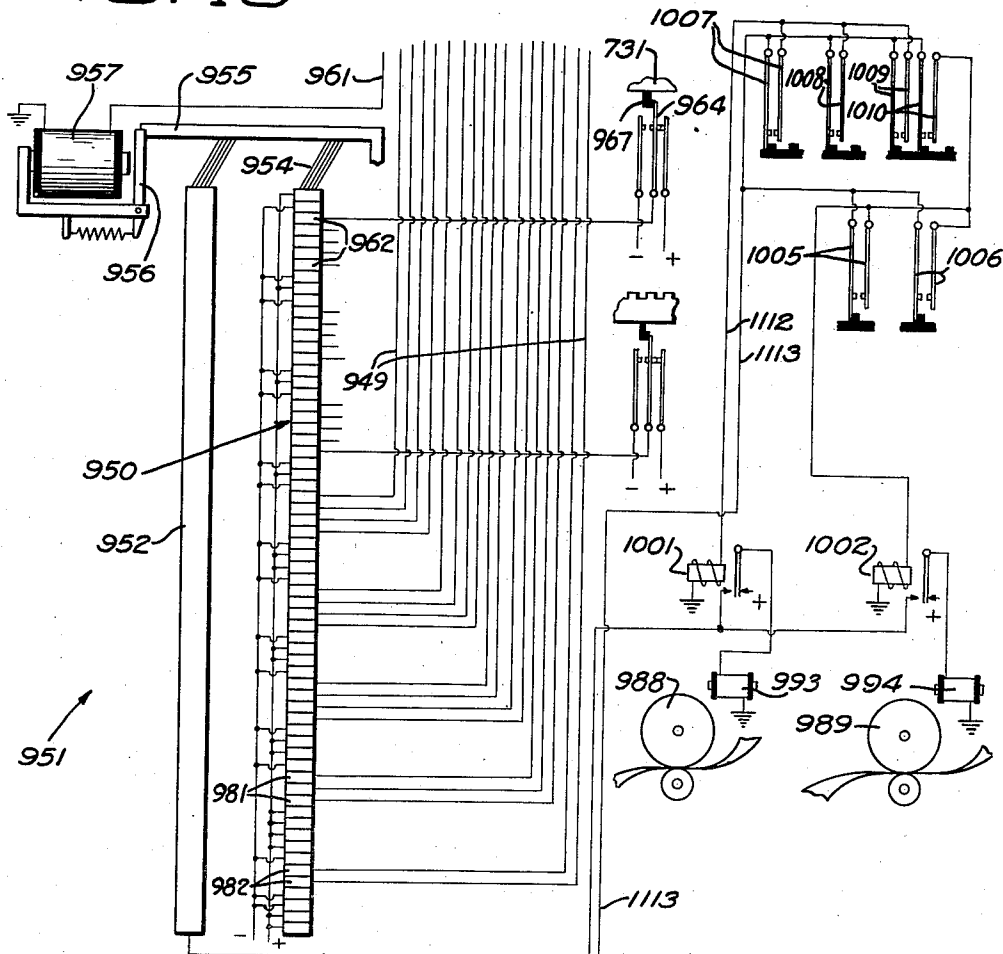


FIG. 11

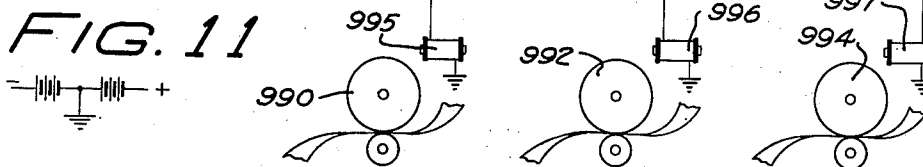


FIG. 12

GM 216 $\frac{1}{8}$ X 160 $\frac{3}{8}$ UC 185 EK 194

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UNITED STATES PATENT OFFICE

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TELEGRAPH MESSAGE CLASSIFICATION
SYSTEM

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Delaware

Original application January 17, 1929, Serial No.
333,161. Divided and this application March
30, 1933, Serial No. 663,483. Renewed March
31, 1939

56 Claims. (Cl. 178—23)

This invention relates to telegraphic signaling systems adapted for the transmission of news items of classifiable nature, such as, prices of stock, grain and merchandise, and is a division of application Serial No. 333, 161, filed January 17, 1929.

The large number of stocks listed in the modern stock exchange and the vast number of transactions and reports of such transactions upon a ticker tape have produced such a mass of reports thereon that a person who is interested in but one or a few particular stocks is seriously burdened by the necessity to consider all quotations of the total daily ticker tape to find those quotations which are of interest to him. To submit and make possible the expeditious consideration of particular quotations, this invention provides for recording upon one tape the reports of one stock or of any desired number of individually selected stocks or items to the exclusion of all other stocks. If, when editing the ticker tape for publication or for retransmission to provide individual service on particular stocks, one editor is unable to handle the quotations expeditiously, then several editors are employed, each editing the records of a group of specified stocks, and to simplify editing of the reports this invention provides for printing before each editor a tape which contains only the reports of all stocks allotted thereto.

Accordingly, the object of this invention is to provide a system including a set of printing telegraph machines upon each of which are recorded the reports pertaining to a group of stocks comprising in total the reports of all of the listed stocks and/or further to provide for recording on a printing telegraph machine the reports of a single stock or of selected stocks.

These objects are attained by providing a group of selectively activated printers, and by providing in cooperation therewith a selector upon which all items are registered, the selector being adapted to cause a selection among the printers in accordance with the registration.

At the transmitting station, the several quotation messages are made uniform in structure so that the transmission of each such message shall constitute a succession of code signals in the order of (1) stock name or symbol in letters, (2) price in figures with a fraction and (3) range index. At the receiving station, the code signals for the stock name are first to be received and these are registered in selective manner to render responsive any printer or printers which have been assigned to the stock represented by the signals

registered, after which the stock name of the registered signals as well as the price and range of the subsequent signals in any message, are recorded upon the responsive printer or printers. The acts of registering the stock name or symbol and reendering a printer or printers responsive in accordance therewith is repeated in full cycle for each and every message. The printers thus rendered responsive may be grouped in any manner suited to the traffic and any specified stock may appear in one or more groups, at the same time being sole to one or more printers, all as desired.

This invention contemplates the continuous transmission of an indefinite number of generally similar but specifically classifiable telegraphic messages over a path of communication, the automatic classification of the messages by the receiving mechanism, the automatic selection by the receiving mechanism of a destination or of a further path identified with the classification of a current message, and the ultimate propagation of the entire message into the selected further path. Each message is classified according to the leading part of the message and a sufficient part of the message is recorded in a selector to cause the selector to identify the further destination or path to be used, the selector having the further function of storing in reproducible form the signal impulses which have operated it to effect the selection.

In the specific embodiment chosen for illustration, the messages are stock-market quotations each comprising a stock code of one or more letters followed by a series of figures for prices and containing at times also a character other than figures and forming a part of the message. In these messages, the letters of the message form the leading part upon which classification is based, which operates the selector and which is stored in the selector in reproducible form. The remainder of the message also is stored by means auxiliary to the selector, and a repeater distributor is arranged to retransmit the entire message from the two storage devices; namely, selector and the auxiliary means.

In the selectable further paths above referred to there are connected a number of printers, which may be of stock ticker design, such as disclosed in Patent No. 1,821,110, issued September 1, 1931, to S. Morton et al. wherein is described a six-impulse printer, five impulses of the received code acting to position a typewheel selectively, and the sixth impulse acting to select one or the other of two "case shift" platens or hammers for

printing, after which the mechanism operates the selected hammer to press a record tape against the typewheel and thereafter operates to feed the record tape into its next printing position. A single printer may print quotations for several stocks, or for all stocks beginning with a specified first letter, or for several first letters, as A to G, or a printer may print the quotations of a selected list of stocks and a companion printer may print "all others," and a specific stock may be printed by several printers as desired.

A better understanding of the invention may be had from the following description, taken in connection with the accompanying drawings wherein,

Fig. 1 is a circuit diagram of the transmitter keyboard mechanism in one embodiment of the invention,

Fig. 2 is a view of a detail of the improved keyboard as shown in Fig. 1,

Fig. 3 is another view of the detail of the keyboard shown in Fig. 2 with the locking members shown in operated position,

Fig. 4 shows a detail of the lock restoring mechanism with the locking members in locked position,

Fig. 5 is a top view of a part of the keyboard and of the lock restoring members with the locking members in locked position,

Fig. 6 is a chart of codes suitable for a telegraphic system using this invention,

Fig. 7 is a circuit diagram of a distributor for routing the indicating impulses into the desired local circuits,

Fig. 8 shows details of a selector,

Fig. 9 shows further details of the selector of Fig. 8,

Fig. 10 is a diagram of an arrangement of selective stock tickers for use according to this invention,

Fig. 11 is a diagram of the potentials indicated elsewhere by symbols,

Fig. 12 is a view of a tape with records according to this invention, and

Fig. 13 is a chart of code signals for control of start-stop recorders.

A keyboard mechanism 1, Fig. 1, comprises eight sets of keyboard sections 71 to 78, of which 71 to 73 each comprise a complete set of standard telegraph typewriter keylevers 79, one for each letter of the alphabet, sections 74 to 76 each comprise ten keylevers 81, one for each of the ten digits from 0 to 9, section 77 comprises seven keylevers 82, one for each of the fractions from $\frac{1}{8}$ to $\frac{7}{8}$ including a break key for "no fraction" and an extra blank keylever 83 for the start operation, and section 78 comprises four keylevers 84 to 87, one each for closing, opening, high and low quotations respectively.

These keyboard sections may be of any construction in which the levers operate electrical contacts in various combinations, as for example, in the manner shown in the patent to L. M. Potts, 1,299,608, issued April 8, 1919, or the patent to E. E. Kleinschmidt, 1,567,392, issued December 29, 1925, for Generating code combinations of impulses, although it will be understood that these patents are cited as illustrations and that any other transmitter such as the keyboards used for call indicators in automatic telephone exchanges may be utilized.

In the illustrated embodiment, keylevers 79 on keyboard 71 selectively operate five contactors 91 between contacts 92 and 93 in various combinations, and as described in the patents referred to above, each keylever 79 will operate

these contactors in individual combinations. Contacts 92 are connected in multiple over conductor 94 to negative generator 95 and through a resistance 96 to ground while contacts 93 are connected in multiple over a conductor 98 to positive generator 99 and through a resistance 100 to ground. All keylevers on keyboards 71, 72, and 73 control similar contactors.

Levers 81 on the keyboards 74, 75, and 76 comprising each ten digits, selectively control 10 four contactors 105 operating between contacts 106 and 107, connected to generators 95 and 99, and upon depression of any one of keylevers 81, combinations of four contacts are closed as is well-known. Keybank 77 similarly controls 15 combinations of three contactors 195 for providing the necessary seven codes for the fractions and keylevers 84 to 87 each control one contactor 105. Key lever 83 controls contactor 195.

Upon operation of a keylever 79 in bank 71 a locking mechanism operates to lock the operated key in position and to lock the remaining levers on the bank against operation during transmission of a code, then magnet 111 associated with the keyboard operates for releasing the operated key to return from its operated position, and to release all levers of that keyboard to permit operation, which prevents the operation of more than one key in any one keyboard during the transmission of a code of signal impulses.

Details of the latching mechanism are disclosed in Figs. 2 to 5, in which each of the keylevers 79 is pivotally mounted on a pin 115, and is provided with an upward arm 121 and lug 122 and with downwardly projecting lugs 116 in combinations on the under edge thereof which coact with levers 117 pivoted on pins 118 and operate contact closers such as 91 between their contacts 92 and 93. In response to the operation of a keylever 79, Fig. 2, one or more levers 117 will be operated, as shown in Fig. 3, to operate in turn the contact closers 91 associated with them.

A locking lever 124 fixed to rocking shaft 125 journaled in the frame, and under tension of spring 126 from lever 124 to the frame, has a universal locking bar 123 so positioned that when lever 124 and bar 123 are released by latch 127 and rotated by spring 126 the bar will pass under all lugs 122 which are then in normal position and will lock them and their keylevers 79 against movement, while a depressed keylever 79 will have moved its lug 122 past bar 123 and will be held down by bar 123 in operated position. The latch 127, rotatable on pivot 128 and under tension of spring 129 attached to pin 131 and to the frame, has an arm 132 which carries a universal bar 133 extending beneath all of the keylevers 79 of the one keyboard.

Under idle conditions, with all keylevers 79 in non-operated position, spring 129 maintains universal bar 133 in engagement with the lower edges of all of the keylevers, and upon the operation of any lever the universal member 133 is pushed down and latch lever 127 is rocked to disengage lever 124, permitting spring 126 to rock lever 124 to move lock bar 123 to a position shown in Fig. 3, locking all non-operated keylevers against operation and locking the depressed keylever in operated position.

Restoring or unlocking magnet 111, Figs. 1, 4, and 5 is provided with an armature 134 fixed upon rocking shaft 125, so that upon energization of magnet 111 shaft 125 is rocked to move bar 75

123 away from all lugs 122, unlocking the depressed keylever to rise and to permit bar 133 to rise, whereby spring 129 may rotate latch 127 into its normal position, Fig. 2, under arm 124, thus conditioning all keylevers of the one keyboard for operation, and holding the lever 124 after the deenergization of magnet 111.

Referring again to Fig. 1, each of the contact controllers 91 is connected over conductors such as 141 individual thereto to individual segments 142 on a distributor 143 which comprises a first section composed of a segmental ring 144 and a solid ring 145 bridged by brushes 146 and 147 and a second section comprising a segmental ring 148 and a solid ring 149 bridged by brushes 150 and 151.

On ring 144, first segment 153 connected to negative generator, is a stop segment and second segment 154 connected to positive generator is a start segment, while the next fifteen segments are connected to fifteen contact controllers 91 on the first three keybanks 71 to 73, the succeeding twelve segments are connected to contact controllers 105 of keybanks 74 to 76, the next three segments are connected to contact controllers on keybank 77, and the next four segments are connected to contact controllers 105 on keybank 78 and lowermost segment on ring 144 is shown unconnected. Solid ring 145 is connected to a signaling line 155 extending to a receiving apparatus for transmitting thereto the code combinations generated by keybanks 71 to 78. For each cycle of operation of this giant start-stop distributor there are transmitted three letter characters, three numbers, a fraction, and at times a control signal, in which cycle the same combination of impulses may be used for a letter, for a number and for a fraction, and instead of determining by a shift signal which character is a letter and which a number, this is determined by the position of the code combination with respect to the start impulse.

Ring 148 is provided with eight segments 156, each so positioned with respect to permutative segments on ring 144 that brushes 150 and 151 when in rotation pass thereover immediately after brushes 146 and 147 have moved over the corresponding permutative segments, a segment 156 being connected over conductor 159 to magnet 111, associated with the keybank 71 and the other segments on ring 148 are connected to corresponding magnets 111, and solid ring 149 is connected to a battery. When brush 150 engages any segment 156 a circuit is completed through the associated magnet 111 which upon energization restores the latching mechanism for permitting the restoration of the keylevers.

Brushes 146, 147, 150, and 151 are carried on arm 161 in operative relation with a friction clutch 162 which is carried by and rotatable with a driving shaft 163 which also carries a gear 164 and a spring 165 to compress the friction clutch while the gear 164 meshes with pinion 166 carried on drive shaft 167 of a direct current motor 168 comprising an armature 169 and field winding 170, the latter connected at one terminal through a resistance 171 to a source of energy and at the other terminal to ground. Upon the same shaft with the armature 169 is an alternating current motor 173 which is connected through a lamp 174 to the secondary of a transformer 175, the primary of this transformer being connected to two contacts 176 and 177 of a contact spring 178 mounted on one of the tines of a tuning fork 179, which is connected to a source of energy. A cir-

cuit for an electromagnet 181 is periodically closed through a contact engaged by spring 182 mounted on the other tine of tuning fork 179, so that when the tines are spread, a circuit for the electromagnet 181 is closed from positive battery through fork 179, through spring 182 and contact (now closed), winding of magnet 181 and resistance to ground and the magnet thus is energized to bring the fork tines together. In the spread position, current flows through contact 177 and the right-hand half of the primary of transformer 175 to ground, while with the tines closed, spring 178 closes contact 176 and completes a circuit through the other half of the primary winding and in the opposite direction, so that periodical reversals of current are produced in the primary of transformer 175 which in turn induce an alternating current of a predetermined frequency in the secondary of the transformer which flows through the alternating current motor 173. The tines of the tuning fork 179 are made to vibrate at a predetermined frequency, then are kept vibrating at this frequency by the electromagnet 181, and accordingly currents of a constant frequency flow through motor 173 which produces rotation at a speed determined by the frequency of the current flowing therethrough. This frequency control system is more clearly described in U. S. Patent No. 1,764,316 and is illustrated in Fig. 1 of that patent.

Arm 161 is normally latched against rotation by a latching armature 191 pivotally mounted on frame 192 of magnet 193. When the magnet 193 is energized, it moves armature 191 and releases arm 161 for rotation. Magnet 193 is connected over conductor 194 to a contact controller 195 on the keybank 77, which is arranged to be closed upon the operation of any of the keylevers 82 or 83 on keybank 77.

In order to transmit a quotation of a particular item, the operator first depresses a keylever on each of the first three keybanks 71 to 73 for transmitting a code to select the terminal printer to which the quotation is to be transmitted, which code when received will select the recorder assigned to the particular item indicated. The operator will also depress one of the keylevers on each of the banks 74 to 76 which will prepare codes individual to the digits making up the quotation for the indicated item, and also one of the levers 82 on the bank 77 to transmit a code for the fraction in the quotation and a keylever on bank 78 when and if it is desired to transmit a code indicating whether the quotation is close, opening, high, or low. Upon the depression of any keylever in banks 71 to 78 the other keylevers in each such bank are locked from operation and the depressed keylevers are locked in depressed position. Depression of any keylever 82 or 83 closes the contact 195 and energizes magnet 193 to start the distributor, as a result of which the arm 161 is thereupon driven by the motor 168. With the brushes resting on stop segment 153, current from negative generator flows over line 155 as a normal stop condition and when brush 146 moves to the next or start segment 154, positive generator is connected to the line 155 from segment 154, brushes 146 and 147 and ring 145, which current will function to release a distributor located at the receiver similar to the distributor described above.

As brush 146 rotates over the first five segments 142, a code is impressed upon line 155 in accordance with the positions of contact controllers 91 operated by the depression of key-

levers 79 on the bank 71, the impulses being transmitted from sources of energy 95 or 99. As brush 146 moves over the next five segments a code is transmitted in accordance with the contact controllers operated on bank 72 and the same is repeated during the next five segments in accordance with the contact controllers operated on bank 73. As brush 146 moves over the next four segments, a code is transmitted comprising a combination of four impulses individual to a digit, and the same occurs during the next two groups of four segments each, the codes transmitted being determined in accordance with the contacts operated on keybanks 75 and 76. During the further movement of the brush over the next three segments, a code of three impulses indicating a fraction value is transmitted, and as brush 146 moves over the next four contacts, a signal is transmitted in accordance with the depression of a keylever, if any, on bank 78 to indicate a characteristic of the quotation which has been transmitted.

Rotating with brushes 146 and 147 are brushes 150 and 151 and when brush 150 engages segment 156, a circuit is completed for the magnet 111 associated with bank 71, from ground through winding of magnet 111, conductor 159 and through segment 156, brushes 150 and 151 to ring 149 and battery, which is completed immediately after the code recorded on bank 71 has been transmitted, and results in the energization of magnet 111, and the operation of the locking mechanism of Figs. 2 to 5 to release the keylevers on bank 71 thereby conditioning the keylevers for reoperation, permitting the operator to operate another keylever for the next quotation to be sent without waiting until all of the codes for the preceding quotation have been sent. The apparatus at the transmitting station is normally in non-operated condition and upon the operation of keylevers in banks 71 to 77 the distributor 143 is released to make a single revolution during which time the codes are successively transmitted over conductor 155. A similar transmission may be effected by an automatic transmitter controlled by a perforated tape.

Signaling line 155 may extend to a polar relay 711, Fig. 7, at a receiving station, whose armature 712 is connected over a conductor 713 to a ring 715 of a distributor 716, comprising ring 715, a first segmental ring 717 and a second segmental ring 718, bridged by brushes 719 to 721 which are carried on an arm 722.

A starting signal from segment 154, Fig. 1, over line wire 155 will operate polar relay 711, Fig. 7, to close its armature 712 to negative battery and thus close a circuit through wire 713, brushes 719 and 721, and top segment of ring 718 through starting magnet 714 to positive battery, for energizing magnet 714 to operate its armature to release brush-arm 722 which then rotates by power of motor and friction clutch, not shown, but similar to that shown in Fig. 1.

The first fifteen code segments of ring 717 are connected over conductors such as 723 and 724 to associated individual marking selector magnets 725 and 726, Fig. 8, there being a marking magnet for each of the first fifteen code segments although only two such magnets are shown.

The first fifteen segments on ring 718 are connected over conductors such as 727 and 728 to spacing selector magnets such as 729 and 730 respectively, there being fifteen such selector magnets for the first fifteen code segments. Selector magnets 725, 726, 729, and 730 control

notched permutation bars 731 and through those notched bars they control code bars 732 individual to stocks or commodities, which cooperate with releasing magnet 734 and switch operating magnet 735 to control selectively a group of contacts 736 and also a contact 1007 which in turn controls circuits over conductors 1112 and 1113 extending to relays 1001, 1002, 1003, 1004, Fig. 10, each representing a stock item or a group of such.

While the brushes 719 to 721 are rotating over the first fifteen segments in synchronism with brush 146, Fig. 1, selector magnets 725 to 726 and 729 to 730 are energized to select a group of contacts 736 to be closed, individual to the particular stock or commodity, and while brush 721 rotates over the remaining segments on ring 718, a bank of polar relays 791 to 809 are selectively operated in accordance with the operation of the polar relay 711 by impulses received over conductor 155, these impulses being codes for numbers, fractions and range. Relays 791 to 809 accordingly operate their armatures in accordance with the polarity of impulses which operate relay 711, and the armatures of these relays in turn control circuits from battery to conductors 949.

Segmental ring 717, in addition to fifteen segments connected to selector magnets, is provided with a special segment 861 near the end of revolution of brush 720 which is connected over a conductor 862 to a magnet 863, Fig. 9, provided with an armature 864 normally held in its retracted position by a spring 865 in the path of an arm 866 carrying brushes 867 to 869 of a distributor 871, comprising rings 872 to 874 bridged by brushes 867 to 869 on arm 866 which is driven by a motor (not shown) through clutch 870. Ring 872 is provided with a sector 875 which is connected to battery and ring 873 comprises a stop segment 877 on which the brush 868 normally rests and a segment 878 connected over a conductor 879 to magnet 734 which releases the code bars 732 that the selected one may unlatch its group of contacts 736.

In operative relation with each pair of magnets 725, 729, is a notched permutation bar 731, Figs. 8 and 9, each having a series of equally spaced notches in its upper edge and a notch in its lower edge, and each under tension of a spring which draws the bar toward the armature of the marking magnet 725, whose attraction and operation may move the permutation bar so that armature of the magnet 729 then may engage the notch in the lower edge of the permutation bar to restrain the bar against the action of the spring until such time as the spacing magnet may be energized to withdraw its armature. In this manner all of the fifteen permutation bars 731 may be positioned selectively in accordance with a received code.

Pivoted at 733 and just above the permutation bars 731 are selector code bars 732 arranged so that each code bar 732 crosses all permutation bars 731, each code bar 732 being provided with a series of equally spaced lugs, one lug over each permutation bar, each lug being bent to the right or to the left of the plane of the code bar, by which bending each lug will either be over a lug or over a notch, optionally, of a permutation bar in the spacing position. Each code bar 732 is individual to an individual corresponding code of impulses by which the permutation bars may be set in code position, so that a specific code bar may have notches in all permutation

bars positioned under all lugs of the code bar. To effect this condition, magnet 729 will be energized momentarily under bars 731 which correspond to spacing impulses in the code, and the lugs of the responsive code bar 732 will be bent to be then over notches in the spacing-signal permutation bars, while magnet 725 will be energized momentarily under bars 731 which correspond to marking impulses in the code and the lugs of the responsive code bar 732 will be bent to be then over notches in the marking-signal permutation bars. Code bars 732 are pivotally mounted on a common pivot at 733 and are urged toward the permutation bars by springs not shown. The code bars are held up by a universal member 737 carried by a spring-tensioned bell-crank member which is operated by the armature of solenoid magnet 734 which, when energized, lowers the member 737 and permits all code bars 732 to move into engagement with permutation bars 731. All code bars will be stopped by one lug or more engaging lugs on permutation bars except that there may be one only selected code bar which will have notches under all lugs and which, therefore, will move farther.

Positioned under the free ends of code bars 732 are latches 738 on a common pivot 739 and each latching its associated switch bar 740 against movement by tension of the contact springs in its individual switch 736. All switch bars 740 may be engaged and rotated counterclockwise by a single universal member 741 carried by a rocking lever 742 pivoted at 743 and operated by armature 744 of solenoid 735, when energized over wire 745 and segment 746 in distributor 371.

When brush 720, Fig. 7, engages segment 861, a circuit is closed from either battery of armature 712 through ring 715, brushes 719 and 720, segment 861, wire 862 and magnet 863, Fig. 9, to ground, operating armature 864 and releasing brush arm 866. Immediately thereafter brushes 867 and 869 close a circuit from battery through segment 746, wire 745, and solenoid 735 to ground, operating the universal member 741 to restore any previously operated switch bar 740 and to lift all switch bars 740 from their latches 738 to render the latches free to move, and simultaneously brushes 867 and 868 close a circuit from battery through segment 878, wire 879, and solenoid 734 to ground, operating universal member 737 and releasing all code bars 732, to permit a selected code bar to operate its latch 738 to clear the shoulder of the switch bar 740. Segment 746 is shorter than segment 878, so that the circuit of solenoid 735 is interrupted and member 741 permits all switch bars to move clockwise to engage their several individual latches, the selected switch bar not engaging its operated latch and, therefore, moving enough to permit its switch 736 to close its contacts, including contacts 1007.

The operation of the complete selective system is as follows:

Codes of impulses received over conductor 155, Fig. 7, variably operate polar relay 711 to move its armature 712 between its two contacts. Normally, armature 712 is in contact with positive battery and start magnet 714 is also connected to positive battery and, therefore, is unenergized, but upon receipt of a starting impulse, armature 712 engages negative battery and a circuit is completed over armature 712, conductor 713, ring 715, brushes 719 and 721, first segment of ring 718 and winding of magnet 714 to positive battery, energizing magnet 714 to release arm 722, which with

its brushes 719 to 721 now is rotated by a motor, as in Fig. 1. As brushes 720 and 721 move over the first fifteen segments of rings 717 and 718, circuits are completed alternatively to either the marking magnet 725 or spacing magnet 729 of each pair, depending upon the operation of the armature 712 of the polar relay 711 in response to impulses over conductor 155, thus setting the permutation bars 731 to select a code bar 732 for operation.

As brush arm 722 rotates further, positive or negative impulses are transmitted to polar relays 791 to 809 through armature 712, ring 715, brush 719, brush 721, and segments of ring 718, relays 791 to 808 and ground.

During the rotation of arm 722, brush 720 engages segment 861 and a circuit is completed from either polarity of battery at armature 712, over conductor 713, ring 715, brushes 719 and 720, segment 861 and conductor 862, the starting magnet 863 and ground, operating armature 864 to release arm 866 for rotation, and as brushes 868 and 869 engage segments 878 and 746, circuits are completed for magnets 734 and 735 which restore the prior operated switch bar 740 and operate the now selected switch bar 740 as has been made clear above, to close the selected contacts 1007.

Incoming price signals now have been stored in the primary relays 791 to 809 and by reason of that storage they are manifested as positive and negative potentials upon wires 949, Figs. 7 and 10.

In Fig. 10, there is illustrated diagrammatically a system showing several stock tickers or printers individually operative under various conditions of ticker selection. Printers of the class preferably employed in this capacity are of the start-stop type such as is shown in the Patent No. 1,821,110 to Morton et al. above referred to. Characteristic of this class of device is the particular signaling system where in addition to the six code impulses there is a preceding start impulse and a concluding stop impulse. In order to cause the stock quotation signals employed in the transmission system herein disclosed to conform to the peculiar requirements of start-stop printers, distributor 951 is provided and the translation is performed as follows:

Ring 950 is divided into a plurality of segments, the first of which is connected to positive battery to produce a marking signal or stop impulse, so that the printers will not be operated while distributor arm 955 is at rest, and a start magnet 957 is connected over control line 961 to the bottom segment of ring 717, Fig. 7, and is operable over a circuit which is closed momentarily just before distributor 716 stops. Energization of magnet 957 retracts armature 956 against the pull of its spring and permits distributor arm 955 to start and make a complete revolution.

The second segment on the ring 950 is permanently connected to negative battery to produce a starting impulse to start the selected printer for a single operation. The five segments following are electrically controlled by the corresponding first five code bars 731 of the selector, Figs. 8 and 9, through a lug 967 upon each code bar 731 which engages a contact spring 964 so that when the code bar 731 is in its marking position connection is made between the spring 964 and its right-hand contact and positive battery, and conversely, when in its spacing position connection is made between the spring 964 and its left-hand contact and negative battery, so that each of the five segments 962 assumes a potential corresponding to the position of its corresponding code bar 731.

The eighth segment corresponds to the sixth code impulse of a code for the printer and functions as a shift signal to condition the printer mechanism to print a letter in response to the five signals upon segments 3rd to 7th inclusive of the ring 950.

The ninth and seventeenth segments of the ring 950 are the same as the first and represent the cessation of the cycle in the ticker. Each is followed by a negative start segment, five code segments, and a letter-case shift segment, and the twenty-fifth segment is a stop-signal segment. When brush 954 reaches the twenty-fifth segment, the three letters of the quotation message will have been transmitted over ring 952 to all printers connected therewith, and the next cycle of each such printer is to result in a figure printing operation. The figures code requires but a four-impulse permutation and is accompanied by a fifth impulse which is always negative and a sixth impulse which is always positive. Accordingly, the twenty-sixth segment is a negative start segment, then follow the necessary four segments for the figure identification, controlled by relays 800, 791, 801, 792, over wires 849, and a permanently connected negative fifth code segment, a permanently connected positive segment for the figure-case shift signal and a permanently connected positive segment for the stop signal. The arrangement of any particular code of transmission is, of course, a purely arbitrary allotment so that while certain of the code combinations herein disclosed may differ from those of corresponding characters in other systems, it will be understood that a uniform plan is intended. A suitable code is disclosed in chart form in Fig. 13. The two succeeding printing cycles are similar to the one just described and are followed immediately thereafter by the fraction segments 981 of which there are but three and after which there follow three positive segments to produce the standard six impulse code interval. The final cycle during which the characteristic or range signal is transmitted requires but two variable impulses in the permutation, hence there are provided but two connected segments 982. Of the remaining four segments two are connected to negative battery and two to positive battery. These impulses are followed by the stop impulse from the first segment, after which the cycle repeats.

Reference numerals 988 to 990, 992 and 994 indicate printers such as referred to above, magnets 993 to 997 being receiving magnets for code impulses, and the several printers are variously connected so that only certain ones of them operate under predetermined conditions of selection. For example, the printer 988 is provided with a control relay 1001 which in turn is connected to contacts 1007, 1008, and 1009 carried on selector banks, as 736, Fig. 9, so that when any of these particular stock selections are made effecting any of these contacts by shifting them, then, and then only, the printer 988 is rendered effective to record the stock quotation, while relay 1002 of printer 989 is connected to the contacts 1005, 1006, and 1010, so that this printer is operative only during the selection of any of the three corresponding stocks. Printers 990 and 992 are connected to operate alternatively by contacts of relays 1003 and 1004 of which only one contact may be closed at any one time, and whereby during any stock selection the printer 990 is rendered operative while at all other times the printer 992 is in operative condition. The

selector of Figs. 8 and 9 thus constitutes a pilot means which, by its selective contacts 1007 and others, determines selectively a path for transmission of impulses from its storage contacts 964, Fig. 10.

It will be seen that in accordance with the present invention there are provided several convenient modes of associating printing mechanisms with the selecting system. These modes may be varied in accordance with particular requirements as they arise, such as for example, in the case of stock specialists where only certain stocks are required to be recorded.

In the operation of this invention the speeds at which the printer and distributors are operated are suitably controlled.

Final code segments 982 transmit a code to the printer in accordance with the setting of two storage relays 799 and 809, to print a distinctive mark on the printer tape indicating the type of quotation that has been received, such as an arrow mark pointing upward or downward, Fig. 12, to indicate a new high or low quotation price.

An overlap is provided by arranging that the brush 954 shall start before the brush 721 stops, as a result of which the brush 954 will have at all times a cyclic position in one cycle which will be in advance of the cyclic position of brush 721 in the next cycle, and the brush 954 will use each stored signal before the brush 721 resets the bar 731 or the relay 791 to 809, by which the signal is stored, and the brush arm 722 is so timed in speed that the brush 954 in distributor 951 will complete its cycle just before the distributor 871, Fig. 9, operates solenoid 735 to open the contact 1007 or/and others to open the circuit over which the brush 954 has been transmitting.

Although the invention has been described in connection with a specific form thereof, it will be understood that it has further applications and it is not intended to be limited in scope by the embodiment shown herein for illustration.

The invention claimed is:

1. In a telegraph system, a telegraph circuit, means to transmit character code signals over said circuit, a printing recorder controlled by said signals, said recorder including shift mechanism, and means to control the shift mechanism independent of said character code signals transmitted over said circuit.

2. In a printing telegraph system, a master station, a substation, a plurality of printing recorders at the substation, a circuit connecting the master station and the substation, means to transmit over said circuit a series of signals, means responsive to part of said signals and acting to select one or more of said recorders, and means responsive to another part of said signals and acting to make record on the selected recorders.

3. In a system to record a plurality of items, a transmitter, a plurality of recorders, an electrical connection between said transmitter and said recorders, means to cause the signals corresponding to any item of a selected group of said items to control one of said recorders, and means to cause the signals corresponding to any item of another selected group of said items to control another of said recorders.

4. In a printing telegraph system, a master station, a substation, a plurality of recorders at the substation, a circuit connecting said substation and said master station, means to transmit

impulse conditions over said circuit, means responsive to said impulses for selecting one of said recorders, means for transmitting other impulse conditions over said signaling line, and means responsive to all of said impulse conditions for controlling said selected recorder.

5. In a printing telegraph system, a master station, a substation, a plurality of recorders at said substation, a circuit connecting said master station and said substation, means for transmitting code combinations of impulse conditions from said master station to said substation, means at said substation responsive to some of said impulse conditions for selecting a group of said recorders, and means responsive to further impulse conditions for operating the recorders of said selected group.

6. In a stock quotation system, a plurality of recorders, an electrical circuit, means to transmit over said circuit a series of code signals, certain of said code signals corresponding to stock designations, certain other of said code signals corresponding to a characteristic of a stock, means under control of a stock designation signal to select one of said recorders, and means under control of the characteristic code signal to record on the selected recorder the corresponding characteristic.

7. In a recording system, an electrical circuit, means to transmit over said circuit a start impulse followed by a series of code impulses, a plurality of recorders, means controlled by said code impulses to select a recorder, and means controlled by other of said code impulses to record on the selected recorder characters indicating characteristics of a stock to which said recorder corresponds.

8. In a recording system, an electrical circuit, means to transmit over said circuit a series of permutation code impulses, a series of recorders, means under the control of said impulses to select a recorder, means also under the control of said impulses to record on the selected recorder characteristics representing desired characteristics of an item to which said recorder corresponds.

9. In a telegraph system wherein a plurality of messages are to be transmitted each message comprising a routing part and a body part, means for transmitting messages, a plurality of recorders, means controlled automatically by the routing part of a message to select a recorder, and means to record the message on the selected recorder.

10. In a telegraph system wherein a plurality of messages are to be transmitted each message comprising a routing part and a body part, means for transmitting messages, a plurality of type printing recorders, means controlled automatically by the routing part of a message to select a recorder, and means to record the message on the selected recorder.

11. In a printing telegraph system, a master station, a substation, a plurality of recorders at the substation, a selector at the substation for selecting one of said recorders, a circuit connecting the master station and the substation, and means to transmit over said circuit a series of signals for operating said selector to select one of said recorders and for making a record on the selected recorder.

12. In a telegraph system, a plurality of devices operable by code-signals, a telegraph circuit, means to transmit over said circuit a series of code-signals, selector means operable by said

code signals to select one of said devices, and means in said selected device responsive to said code signals.

13. In a telegraph system, a plurality of devices operable by code-signals, a telegraph circuit, means to transmit over said circuit a series of code-signals to operate said devices, and means controlled by the same said code-signals to bring different ones of said devices into operative condition with respect to said code-signals.

14. In a telegraph system, a plurality of recorders, a telegraph circuit, means to transmit on said circuit a series of messages each message composed of a plurality of codes to operate a selected one of said recorders, and means controlled by certain of said codes to select a recorder and controlled by other codes to disconnect the selected recorder.

15. In a telegraph system, a telegraph circuit, means to transmit over said circuit a series of signals, a mechanical distributor controlled by said signals, a plurality of recorders adapted to be controlled by said distributor, a selector adapted to bring selectively different ones of said recorders into operative relation with said distributor, and means rendering said selector selectively operated according to said signals.

16. In a telegraph system, two tandem telegraph circuits, means to transmit signals on the first of said circuits, means controlled by said signals to select a receiver for the second of said circuits, and means to transmit on the second of said circuits other signals corresponding to the signals first mentioned.

17. In a quotation system, a plurality of recorders adapted to record consecutive quotations, means to select a recorder according to the identity of the stock quoted, and means to record on the selected recorder, numerical characters according to the price and other characters according to the range of the quotations.

18. In a quotation system, means to transmit a series of signals indicating the stock, the value and the range of a quotation, a plurality of recorders each recorder corresponding to a stock, means to select a recorder according to the stock signals, means to record according to the value signals, and additional means to make a special record according to the range signals.

19. In a printing telegraph system, a plurality of printers, means for selecting one of said printers, a typewheel in each printer having printing surfaces representing figures and other printing surfaces representing ranges, and means to operate said selected printer after selection to print at times a figure and at other times a character representing range.

20. In a telegraph system, a transmitter for sending over a single channel a series of code signals representing a series of unit messages each unit message comprising a group of letters followed by a group of figures, a plurality of printers, and means to record letters and figures of some unit messages on one of said printers and letters and figures of other unit messages on another of said printers.

21. In a telegraph system, a transmitter for sending over a single channel a series of code signals representing a series of unit messages each unit message comprising a group of letters followed by a group of characters, two printers, means to record legibly unit messages upon one of said printers, and switching means to change the record to the other of said printers, said

means effective to limit any unit message to the records of a single one of said printers.

22. In a telegraph system, a single channel, means for sending over said single channel a series of signals representing a succession of unit messages of two classes, each unit message comprising a group of letters followed by a group of figures, a telegraph receiver normally associated with said channel to receive said signals, and means responsive to the signals of a message of one of said two classes for automatically disabling said receiver.

23. In a telegraph system, a single channel, a transmitter for sending over said single channel a series of signals representing a succession of unit messages each unit message comprising a group of letters followed by a group of figures, a telegraph receiver normally associated with said channel to receive said signals, and selective means responsive to said signals for disabling said receiver.

24. In a printing telegraph system having a plurality of printing instruments connected to record stock quotations, the method of assigning different quotations to different instruments which consists in selecting the respective instruments by the letter-portion of the quotation and then recording all of the quotation.

25. In a printing telegraph system, a plurality of receiving printers responsive to received code combinations of impulses, a directing receiving instrument having selectors also responsive to some of said impulses, circuit controllers operable by said selectors, and means governed by said controllers to render at all times at least one of said receiving printers effective.

26. In a printing telegraph system, a receiving instrument having selecting mechanism responsive to received code combinations of impulses, a plurality of printers, and a plurality of circuit controllers actuable by said selecting mechanism to select one of said printers and to render said selected printer responsive to said code combinations of impulses.

27. In a telegraph system in which the transmitted intelligence is constituted of groups of characters, a plurality of receiving recording instruments and means actuated by the received intelligence to render certain of said receiving instruments ineffective to record certain of said groups and permitting other of said instruments to record the same.

28. In a printing telegraph system, a receiving instrument having selecting mechanism responsive to received code combinations of impulses, a plurality of circuits, a plurality of circuit controllers, means actuated by said selecting mechanism and actuating said circuit controllers, and printers having operating magnet windings included in said circuits governed by said circuit controllers.

29. In a unit message system in which each message comprises a group of characters, two registers, switching mechanism, means controlled by said switching mechanism during receipt of a portion of a unit message for preparing to render one of said registers operative and the other of said registers non-operative, and means operative subsequently for completing the prepared operations.

30. In a printing telegraph system for recording intelligence characters, a plurality of receiving instruments each having selecting mechanism responsive to permutation code combinations of selecting impulses, one of said instru-

ments having circuit controlling means actuated by said selecting mechanism subsequent to receipt of permutation code signals representing a complete group of characters, the other instruments having printing mechanism positioned by said selecting mechanism, and means actuated by said circuit controlling means for rendering one of said printing mechanisms effective and for rendering the other of said printing mechanisms ineffective.

31. In a telegraph system in which the transmitted intelligence is constituted of groups of characters, a plurality of receiving recording instruments, means operative during the receipt of a group of characters to render certain of said receiving instruments ineffective to record all characters of a subsequently transmitted group of characters and for permitting others of said instruments to record the same.

32. In a unit message system in which each quotation or message comprises a group of characters, a plurality of registers, and switch mechanism operative upon the receipt of an initial portion of the message to be printed to render one of said registers operative and the other of said registers non-operative.

33. The method of classifying received intelligence in a telegraph system, which consists in automatically directing the intelligence into one or another predetermined channel determined by an initial portion of each group of intelligence characters.

34. In a telegraph system wherein the received intelligence is arranged in groups of characters comprising a letter or letters followed by figures, the method of classifying said intelligence which consists in directing the groups into different channels determined by a certain part of each group.

35. In a telegraph system wherein the received intelligence is arranged in groups of characters, the method of classifying said groups which consists in receiving all of said intelligence upon a plurality of receiving instruments and causing a certain part of each group to select an instrument upon which the group shall be recorded and preventing the other instruments from recording the same.

36. In a telegraph system in which the transmitted intelligence is constituted of groups of characters, a plurality of receiving instruments each connected to receive all of the transmitted intelligence, certain of said instruments having means to render the recording function inoperative, and means associated with one of said instruments responsive to a certain portion of each group to determine which instruments shall function to record and which instruments shall not record the intelligence group.

37. In a printing telegraph system for recording intelligence characters, a plurality of receiving instruments each having selecting mechanism responsive to permutation code combinations of selecting impulses, one of said instruments having circuit controlling means actuated by said selecting mechanism, the other instruments having printing mechanism positioned by said selecting mechanism, and means actuated by said circuit controlling means to render one or another of said printing mechanisms ineffective determined by a certain portion of any word or group of received characters.

38. In a printing telegraph system having a plurality of printing instruments connected to record the received intelligence, the method of

assigning different portions of the intelligence to different instruments which consists in controlling the respective instruments by a certain portion of each group of intelligence characters.

39. In a signaling system, a source of signals comprising a plurality of groups of character code signals consisting solely of selecting impulses transmitted in continuous succession and forming part of a single message, and means responsive to said signals and arranged to insert rest and start impulses intermediate each character code group.

40. In a signaling system, a source of signals comprising a plurality of groups of character code signals transmitted in continuous succession and forming a part of a single message, a receiving distributor and means including said distributor for applying printer control conditions to each character code group.

41. In a signaling system, a source of signals comprising a plurality of groups of character code signals transmitted in continuous succession and forming a part of a single message, a receiving distributor and means including said distributor for inserting a case shift condition in each character code group.

42. In a signaling system, a source of signals comprising a plurality of groups of character code signals, said groups consisting of a non-uniform number of selecting conditions, a distributor arranged to receive said signals, retransmitting means associated with said distributor and means for adding selecting conditions to said character code groups to render the number of selecting conditions in each group uniform.

43. In a telegraph system, a printing mechanism including a case shift apparatus, means responsive to character control signals for effecting type printing operations, and means independent of said character control signals for operating said case shift apparatus at predetermined intervals.

44. A telegraph system comprising a source of letter-code permutation signals, a pilot register, and a plurality of printers, said pilot register responsive to all of said letter-code signals and including circuit controlling means to distribute predetermined ones of said signals to one or another of said printers.

45. A telegraph system comprising a source of letter-code permutation signals, pilot means, and a plurality of printers, said pilot means responsive to all of said letter-code permutation signals and including circuit controlling means to distribute predetermined ones of said signals to a predetermined one of said printers.

46. A telegraph system comprising a source of letter-code permutation signals, pilot means, a plurality of printers, means for repeating said permutation signals, said pilot means responsive to all of said letter-code permutation signals, and said means for repeating responsive to said pilot means to distribute predetermined ones of said signals to a predetermined one of said printers.

47. A telegraph switching system comprising a source of letter-code signals consisting of groups of character permutations, a pilot register, a plurality of printers associated therewith, said pilot register responsive to all letter-code signals received from said source, and means controlled by the selective operation of said pilot register for distributing one group of signals to one of said printers and another group of signals to another of said printers.

48. The method of telegraph operation, which consists in separating a message into two parts, using one part to determine automatically the routing of the message, and retransmitting the entire message subsequent to its routing.

49. In a telegraph system, means to transmit a series of electrical signals representing a plurality of messages, each message comprising a routing part and a body part, means to receive and to store the signals, a plurality of telegraph circuits, automatic means controlled by the signals of the routing part of a message to select one of the circuits, and means to transmit over the selected circuit the complete message.

50. In a telegraph system, a plurality of devices operable by code signals, a telegraph circuit, means to transmit over said circuit a series of code signals, selector means operable by said code signals to select one of said devices, and means in said selected device responsive to all of said code signals for making a record thereof.

51. A printing telegraph switching system comprising a line, means to transmit code signals over said line, a plurality of recorders distantly located to said transmitting means and responsive to impulses transmitted over said line, a relay individual to each of said recorders, and means controlled by certain of the code signals for operating a predetermined relay whereby the recorder thereof responds to impulses transmitted over said line from said transmitting means.

52. A printing telegraph switching system comprising a line, means to transmit code signals over said line, a plurality of recorders distantly located to said transmitting means and responsive to impulses transmitted over said line, a relay individual to each of said recorders, and means including a plurality of code bars and selectable elements controlled by certain of said code signals for operating a particular selectable element to operate a predetermined relay whereby the recorder for said relay responds to impulses transmitted over said line from said transmitting means.

53. A printing telegraph switching system comprising a line, means to transmit over said line permutation code signals, an office at which said line terminates, a plurality of recorder circuits at said office, a rotary distributor at said office, a selector associated therewith, selecting circuits controlled by said selector, means included in said selecting circuits for connecting said line selectively to one of said recorder circuits, and means for applying predetermined code signals received over said line to said rotary distributor to operate said selector.

54. In a telegraph system, a plurality of devices operable by start-stop code signals, a telegraph circuit, means to transmit over said circuit a series of different code signals, selector means operable by certain different code signals impressed on said circuit to select any one of said devices for operation, and means for establishing the start-stop conditions for said selected device whereby it responds to the code signals transmitted over said circuit.

55. In a signaling system, a source of signals comprising a plurality of groups of character code signals consisting solely of selecting impulses transmitted in continuous succession and forming part of a message, and means responsive to said signals and arranged to insert rest and start impulses for each group of character code signals.

56. In a telegraph system, a first circuit, a second circuit, a plurality of control elements, means to set said elements successively according to successive signals to be transmitted, means controlled by the elements to transmit on the first circuit corresponding signals composed only of code impulses and in which the first code impulse of one signal immediately follows the last code impulse of the preceding signal, means controlled by the signals on the first circuit to transmit on the second circuit signals in which the code combinations of impulses correspond to the code impulses of the corresponding signals on the first circuit, and means for adding automatically to each of the code combinations of impulses to be transmitted over the second circuit start-stop signals for appropriate control.

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