

Dec. 1, 1931.

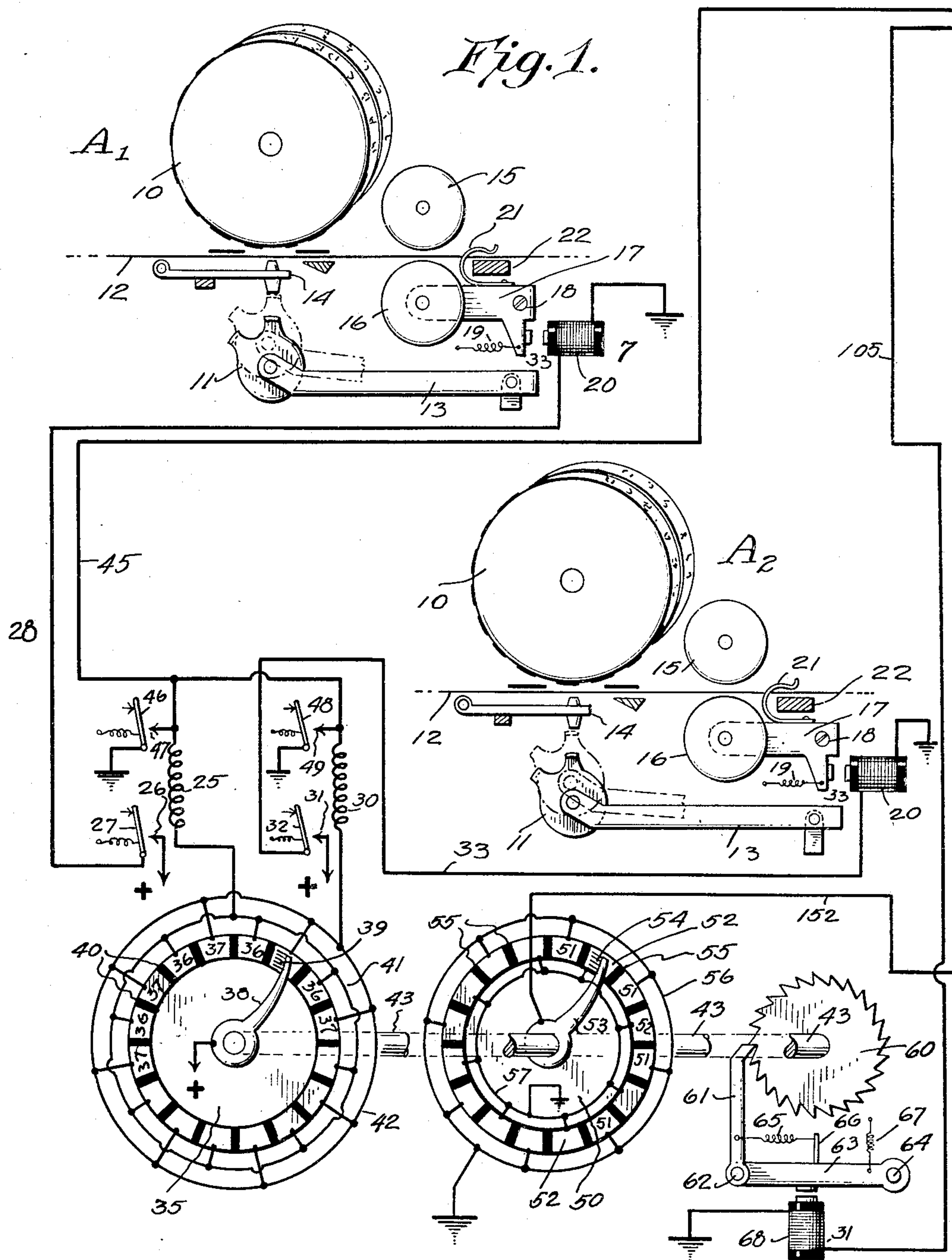
R. F. DIRKES ET AL

1,834,828

PRINTING TELEGRAPH SYSTEM

Filed May 19, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

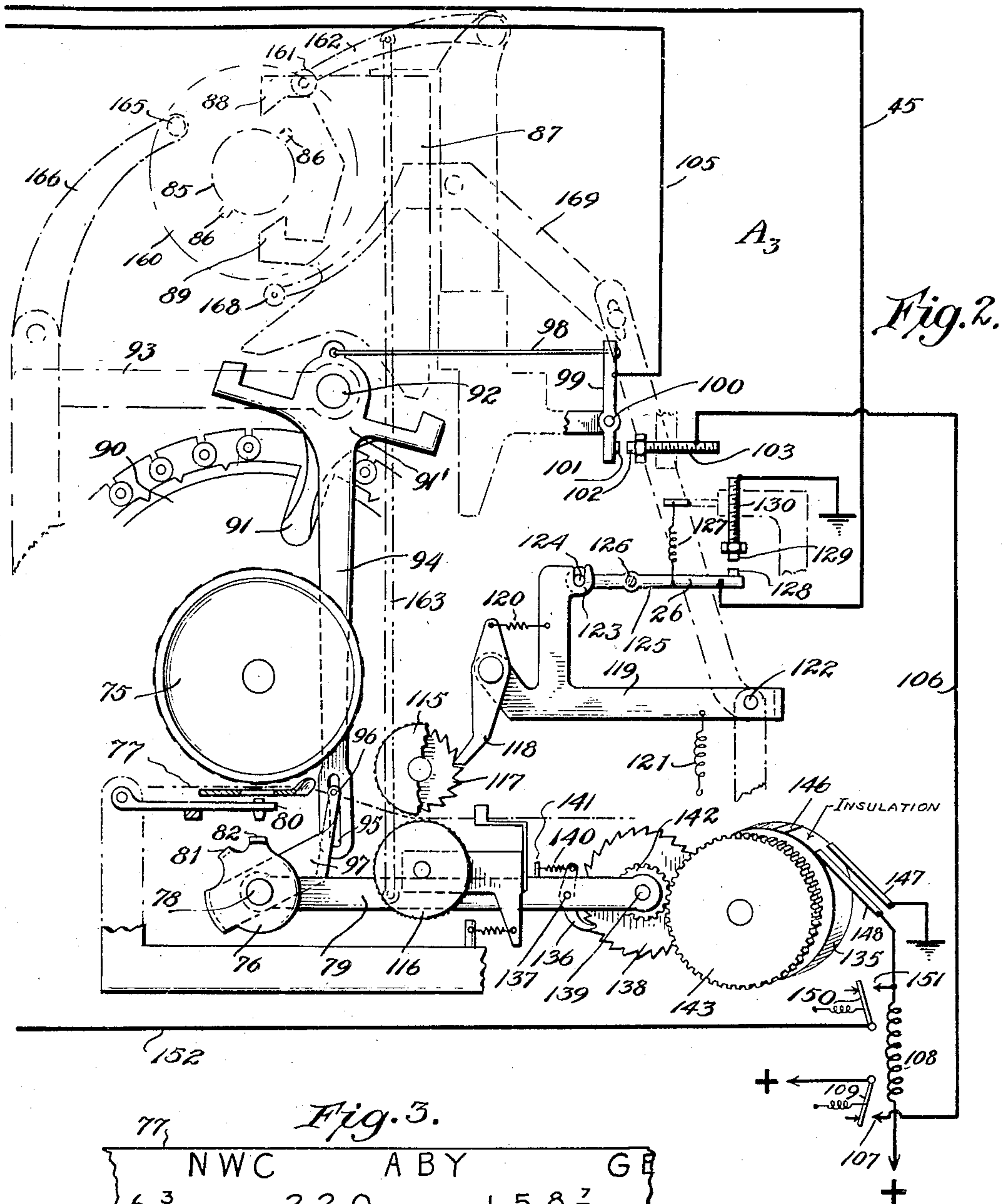


Fig. 3.

NWC	ABY	GE
6 $\frac{3}{4}$	220	158 $\frac{7}{8}$

NWC	ABY
6 $\frac{3}{4}$	220

Fig. 4.

ABY	GE
0	158 $\frac{7}{8}$

Fig. 5.

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UNITED STATES PATENT OFFICE

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PRINTING TELEGRAPH SYSTEM

Application filed May 19, 1930. Serial No. 453,766.

This invention relates to a system for dividing received telegraphic intelligence into groups recorded upon separate printers. While it is particularly adapted for use in dividing stock and market quotations between different operators, it is applicable to various other uses.

With the operation of the automatic brokerage quotation boards recently put into service it has become the practice, due to the speed of transmission needed, to divide the transmitting element of the quotation board system into two parts, each one being controlled by a separate operator and each transmitting unit transmitting quotations in which the first letter of the stock designation begins with the part of the alphabet allotted to that particular transmitting unit. In other words should two transmitting elements be used to operate the full brokerage board, it is customary for one operator through his associated mechanism to send all quotations with stock designations beginning with letters from A to J and the other to send all stock designations beginning with letters from K to Z. At the present time, it is the practice to have a secondary operator, called an editor, at each operating position who crosses out the stocks which are not to be sent by his particular operator. This method of operation is not satisfactory, due to the fact that, first, it requires an extra man to cross out quotations not needed, and second, due to the speed of the received quotations, he is very liable to miss a quotation which should have been crossed out and thereby disconcert the sending operator. Furthermore, the position which he must occupy in order to cross out said stocks naturally obscures the operator's vision for fast retransmission.

A stock quotation message consists of a group of letter characters followed by a group of figure characters. In apportioning such messages among two or more operators it is of course desirable to apportion the received intelligence in such a way that the matter assigned to each operator shall consist of complete quotations, that is, the portion assigned to each operator should begin with

the first letter of a quotation and end with the last figure of a quotation.

Accordingly one object of our invention is to provide a novel system for automatically apportioning among two or more operators, received printed intelligence for manual retransmission thereof by said operators.

Another object of our invention is to provide in a novel system for apportioning received printed intelligence among two or more operators, means whereby the switching-over from one operator to another occurs immediately after the reception of the end of one message unit and before the reception of the beginning of the next message unit.

A further object of our invention is to provide a novel master controller for controlling the operation of a plurality of telegraph printers.

A still further object of our invention is to provide novel timing means for timing the operation of two or more printers between which received intelligence is to be divided.

The various features and objects of our invention will be more fully understood upon reference to the following detailed description taken in connection with the accompanying drawings, while the scope of the invention will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a diagrammatic illustration of two telegraph printers between which received intelligence is to be divided, showing in addition the automatic switching mechanism for switching from one printer to the other.

Figure 2 is a diagrammatic illustration of the master control printer showing a portion of the circuits.

Figure 3 is an illustration of a portion of the tape prepared by the master control printer.

Figure 4 is an illustration of a fragmentary portion of the tape prepared by one of the printers of Figure 1.

Figure 5 is an illustration of a fragmentary portion of the tape prepared by the other printer shown in Figure 1.

In reading the drawings in connection with

the following description, the two sheets should be placed side by side with Figure 2 at the right of Figure 1.

Our invention comprises a plurality of so-called reading printers or tickers, one for each of the operators assigned to re-transmit the received intelligence and a control printer or ticker which will be referred to hereinafter as the master printer. The master printer apportions the intelligence, stock quotations in the specific example described, between operators. The received quotations are printed by one of the reading printers until the master printer effects a switching operation whereupon the operating printer discontinues its printing operation and another printer continues the printing operation from the point where the first printer left off. As will be fully described hereinafter, the switching operation takes place immediately following the complete reception of a stock quotation and before the beginning of reception of the next stock quotation.

In Figure 1, we have shown for the purpose of illustration two reading printers A1 and A2, which are to be controlled by a master printer A3. As will appear hereinafter, our invention is not limited to two reading printers, but may be applied to a larger number. All of the printers illustrated are motor-driven typewheel tape printers, the operations of which are controlled by combinations of positive and negative impulses transmitted over the line to which the printers are connected. All of the operations of a printer are determined by movement of the armature of its polarized magnet actuated by line impulses. These printers may be of the type disclosed in patent to Robert F. Dirkes, No. 1,814,902, granted July 14, 1931.

The reading printers A1 and A2 each comprise a typewheel 10 and a printing hammer 11 between which the tape 12 is fed. The hammer 11 is pivotally mounted on the end of a printing bail 13, and a hammer striker 14 is interposed between the hammer 11 and the tape 12. When the printing bail 13 is rocked in a clockwise direction by a means (not shown) the printing hammer 11 presses the tape 12 against the typewheel 10 the pressure being transmitted through the hammer striker 14.

The mechanism for feeding the tape comprises a feed wheel 15 and a pressure wheel 16, which are operated through suitable mechanism (not shown) for advancing the tape step by step a letter space at a time. The pressure roller 16 is carried by bellcrank 17, pivoted at 18. A spring 19 constantly urges the bellcrank 17 to rock in one direction and an electromagnet 20 is arranged to rock the bellcrank 17 in the opposite direction against the tension of the spring 19. A spring 21 has one of its ends

secured to the bellcrank 17 and its other end extending above the tape 12. The function of spring 21 is to press the tape 12 against the platform 22 so as to prevent any tendency of the tape to creep during the interval when the printer is held non-operative. It will be seen that the spring 21 performs this function when the magnet 20 is energized.

The magnet 20 of printer A1 is controlled by a relay 25 over a circuit which extends from positive battery over contact 26, armature 27, conductor 28, winding of magnet 20 to ground. In a similar manner, the magnet 20 of printer A2 is controlled by a relay 30 over a circuit which extends from positive battery over contact 31, armature 32, conductor 33 and through the winding of magnet 20 to ground.

Energization of relays 25 and 30 is controlled by a distributor 35 comprising a stationary group of contact segments 36 and 37 and a rotatable brush arm 38 carrying a brush 39. Each segment is insulated from adjacent segments by strips of insulation 40. The alternate segments 36 are connected to each other by a common conductor 41 and the intermediate alternate segments 37 are connected to each other by a common conductor 42. The brush arm 38 is secured to a shaft 43 which is driven by mechanism to be described hereinafter.

One terminal of the relay 25 is connected to the conductor 41 which joins the segments 36 and, similarly, one terminal of the relay 30 is connected to the conductor 42 which joins the segments 37. The brush arm 38 is connected to positive battery. Accordingly, when the brush 39 is on a segment 36, positive battery is extended over the brush arm 38, brush 39, segment 36, common conductor 41 to one terminal of the relay 25. In a similar manner, when the brush 39 is over a segment 37, positive battery is extended over the brush arm 38, brush 39, segment 37, common conductor 42 to one terminal of the relay 30. The circuits for the relays 25 and 30 are completed over a conductor 45 in a manner to be described hereinafter.

When relay 25 is energized, it closes a locking circuit for itself over the armature 46, this circuit extending from positive battery over brush arm 38, brush 39, a segment 36, common conductor 41, through the winding of the relay 25, over contact 47 and armature 46 to ground. Similarly when the relay 30 is energized, it closes a locking circuit for itself over the armature 48, this circuit extending from positive battery over brush arm 38, brush 39, a segment 37, common conductor 42, through the winding of relay 30, over contact 49 and armature 48 to ground.

Arranged adjacent to the distributor 35 is a distributor 50 comprising a stationary group of contact segments 51 and 52 arranged concentric with the shaft 43 and a brush arm

53 secured to the shaft 43 and carrying a brush 54. Each segment is insulated from adjacent segments by strips of insulation 55. The alternate segments 51 are connected to each other by a common conductor 56 which is connected to ground and the intermediate alternate segments 52 are connected to each other by a common conductor 57 which is also connected to ground.

It is to be understood that although two reading printers have been shown in Figure 1 any number of printers may be operated in accordance with our invention, the only changes necessary to adapt the system shown to more than two reading printers being duplication of the circuits leading from the distributors. Thus, in the event that three reading printers are to be controlled by a single master printer, every third segment on the distributors 35 and 50 would be connected and the associated circuits filled in duplicate.

The distributor shaft 43 is operated by a pawl and ratchet mechanism comprising a ratchet 60 secured to the shaft 43 and a pawl 61 pivotally mounted on a pin 62 carried by the end of the lever 63 which is pivoted at 64. The pawl 61 is normally maintained in engagement with the ratchet 60 by means of a spring 65 which has one of its ends connected to the pawl 61 and its other end connected to a pin 66 carried by the lever 63. A spring 67 constantly urges the lever 63 to rock in a clockwise direction and a magnet 68 is arranged to rock the lever 63 in a counterclockwise direction against the tension of the spring 67. The operation of the magnet 68 will be described fully hereinafter.

When the magnet 68 is energized, the pawl 61 moves down over the next tooth of the ratchet 60. Upon deenergization of magnet 68, the spring 67 rocks the lever 63 in a clockwise direction operating the ratchet 60 through the pawl 61 a distance corresponding to one tooth of the ratchet. This operation causes the brushes 39 and 54 of the distributors to travel in a clockwise direction and engage the respective adjacent segments.

The master printer A3 may also be of the type disclosed in Patent No. 1,814,902, hereinbefore mentioned. As shown in Figure 2, the master printer A3 comprises a typewheel 75 and a printing hammer 76 between which the tape 77 is fed. The hammer 76 is pivotally mounted on a pin 78 carried on the end of a printing bail 79. A pair of strikers 80 are interposed between the hammer 76 and the tape 77, only one of these strikers being shown.

The printing hammer 76 is provided with oppositely directed striking lugs 81 and 82 offset from each other and adapted to be brought alternately into alinement with either the letters striker 80 or the figures striker 80 by the case shift mechanism as will be described hereinafter.

The mechanism for selectively positioning the typewheel 75 in accordance with the received code combinations of impulse conditions comprises a selector cam drum 85 which consists of a hollow cylinder provided with twelve cam lugs or fingers 86 projecting radially from its outer surface. Located at one side of the selector cam drum 85 are six selector levers 87 provided with arms 88 and 89 projecting above and below the drum and adapted to be moved to either the spacing or marking position by the lugs 86 on the selector drum. The selections set up in the selector levers 87 by the lugs on the selector drum are transferred to code disks 90 by means of transfer levers 91 pivotally mounted on a common shaft 92. The shaft 92 is carried on the end of the transfer bail 93.

There are six transfer levers but only five code disks. The sixth transfer lever 91' is provided with a depending shift arm 94 and in this respect differs from the other five transfer levers. The lower end of the shift arm 94 is provided with a slot 95 which, together with a pin 96 carried by the end of a yoke 97, constitutes a pin-and-slot connection between the shift arm 94 and the yoke 97. The yoke 97 is rigidly connected to the printing hammer 76. As the shift arm 94 is moved in one direction or the other, the yoke 97 is rocked about the pivot pin 78 thereby bringing one of the two striking lugs 81 or 82 into alinement with its individual striker 80 and thereby determining whether letters or figures shall be printed.

Attached to the shift arm 94 through a link 98 is a switch lever 99 pivoted at 100 and carrying a contact 101 which cooperates with a fixed contact 102 carried on the end of a threaded member 103. The switch lever 99 is connected by a conductor 105 to one terminal of the winding of the magnet 68 (Figure 1) the other terminal of which is connected to ground. The threaded member 103 is connected by a conductor 106 to the front contact 107 of a relay 108. The armature 109 which cooperates with the contact 107 is connected to positive battery. The relay 108 is controlled by a timing mechanism to be described hereinafter. When the relay 108 is energized, it prepares a circuit for the relay 68 (Figure 1) and this circuit is subsequently completed at the contacts 101 and 102. This will be more fully set forth in the description of the operation.

The mechanism for feeding the tape comprises a feed wheel 115 and a pressure wheel 116, the feed wheel 115 having associated therewith, a ratchet wheel 117 arranged to be operated by a pawl 118 pivotally mounted on the feed bail 119. A spring 120 having one end connected to the pawl 118 and the other end to the feed bail 119 maintains the pawl 118 in engagement with the teeth of the ratchet 117. A spring 121 constantly urges

the feed bail 119 to rock in a counter-clockwise direction about its pivot 122.

The feed bail 118 is provided with a fork 123 which cooperates with a pin 124 carried on the end of a switch lever 125 which is pivoted at 126. A spring 127 constantly urges the lever 125 to rock in a counter-clockwise direction thus maintaining the pin 124 within the fork 123. The lever 125 carries a contact 128 which cooperates with a fixed contact 129 carried on the end of a threaded member 130. The switch lever 125 is connected by the conductor 45 with one terminal of the relays 25 and 30 (Figure 1). The threaded member 130 is connected to ground.

The timing mechanism for determining the time when the operation of switching over from one of the reading printers to the other reading printer is to occur is associated with the printing bail 79 and operated thereby. In the specific embodiment of our invention illustrated, the timing mechanism comprises a commutator 135. The means for operating the commutator 135 from the printing bail 79 comprises a pawl 136 pivoted to the printing bail at 137 and a ratchet 138 rotatably mounted on the end of the printing bail at 139. A spring 140 has one of its ends connected to pawl 136 and its other end connected to a pin 141 which is fixed to the printing bail. The spring 140 maintains the pawl 136 in engagement with the ratchet 138. A gear 142 which is rigidly connected to the ratchet 138 meshes with a gear 143 which is rigidly connected to the commutator 135. Every time the printing bail 79 is operated, the pawl 136 steps the ratchet 138 one tooth thereby rotating the commutator 135 a corresponding distance.

The commutator 135 is provided with one or more contact segments 146. The number of segments on the commutator determines the number of characters that will be printed between switching over operations. Cooperating with the commutator 135 are two brushes 147 and 148, brush 147 being connected to ground and brush 148 being connected to one terminal of the winding of the relay 108, the other terminal of which is connected to positive battery. Once during each revolution of the commutator 135, the contact segment 146 engages the brushes 147 and 148 and establishes an energizing circuit for relay 108, this circuit extending from positive battery through the winding of relay 108, over brush 148, segment 146, brush 147 to ground. When the relay 108 energizes, it closes a locking circuit for itself over its armature 150, this locking circuit extending from positive battery through the winding of the relay 108, over contact 151, armature 150, conductor 152, brush arm 53, brush 54, a segment 51 or a segment 52 to ground.

The printing operation, the tape feeding operation and the transfer operations are

performed under the control of an operating cam 160. The operating cam 160 is provided with internal and external cam surfaces. Shortly after the start of the rotation of the operating cam 160, the roller 161 on the end of the printing bail lever 162 rises to the peak of the internal cam thereby lifting the rod 163, rocking the printing bail 79 and causing one of the hammer strikers 80 to press the tape 77 against the typewheel 75 thereby printing a character. As the printing bail roller 161 rides down the cam, the roller 165 on the end of the transfer bail lever 166 is riding up on the cam and as it reaches the peak, the transfer bail 93 is rocked to force the transfer levers 91 against the selector levers 87 whereby the character selections previously set up in the selector levers is transferred to the code disks 90. While the transfer bail roller 165 is riding to the peak of the internal cam, the roller 168 on the end of the feed bail lever 169 rocks the feed bail 119 and causes the feed pawl 118 to move upward and engage the next tooth of the feed ratchet 117. Then as the roller 168 rides down the cam 160, the feed bail spring 121 moves the feed pawl downwardly thus stepping the feed ratchet one tooth and through the medium of the feed wheel 115 and the pressure wheel 116 moves the tape 77 forward one letter space.

Operation

In describing the operation of our invention, it will be assumed that the stock quotation to be received is NWC220, as printed on the tape shown in Figure 4, and that this is followed by the stock quotation ABY1537/8, as printed on the tape shown in Figure 5, and that the reading printer A1 is in operation and reading printer A2 is idle in the sense that tape feeding is suppressed. It will further be assumed that the operation of switching over from printer A1 to printer A2 is to take place immediately after the reception of the complete quotation NWC220.

During the printing of NWC220 this quotation will be printed on the master tape 77 as shown in Figure 3 and on the tape of reading printer A1 as shown in Figure 4. However, in the reading printer A2 the tape is not being fed so that the characters are printed one on the other as shown at 175 in Figure 5, that is, first the N is printed, the W is then printed on top on the N, the C is printed on top of the W and similarly the Figures 2, 2 and 0 are printed one on top of the other.

In order that the switching operation may occur following the printing of NWC220, the brushes 147 and 148 are arranged to wipe over segment 146 at any interval during the printing of this quotation. When the segment 146 on the commutator 135 bridges the brushes 147 and 148, a circuit is established

for the relay 108, this circuit extending from positive battery, through the winding of the relay 108, over brush 148, segment 146, brush 147 to ground. Relay 108 energizes and operates its armatures 109 and 150 into engagement with their respective contacts. At armature 150, relay 108 closes a locking circuit for itself, this circuit extending from positive battery through the winding of the relay 108, over contact 151, armature 150, conductor 152, brush arm 53, brush 54, segment 52, common conductor 57 to ground. By virtue of this locking circuit, the relay 108 remains energized even after the segment 146, on the commutator 135, moves away from brushes 147 and 148. In other words, the commutator and its associated segment are free to rotate upon further action of the master printer without disturbing the energization of relay 108. At armature 109 the relay 108 prepares a circuit for energization of magnet 68, but the completion of this circuit depends upon whether contacts 101 and 102 are closed or open.

Contacts 101 and 102 are closed when the shift arm 94 is in the figure printing position and these contacts are open when the shift arm 94 is in the letter printing position. Accordingly, if the shift arm 94 happens to be in the letter printing position at the time that relay 108 is energized, the circuit for the magnet 68 will be incomplete and magnet 68 will not energize until the shift lever 94 is thrown to the figures position. On the other hand, if the shift arm 94 happens to be in the figure printing position when the relay 108 is energized, the circuit for the magnet 68 is immediately completed at armature 109, this circuit extending from positive battery over armature 109, contact 107, conductor 106, threaded member 103, contacts 101 and 102, switch lever 99, conductor 105 through the winding of magnet 68 to ground.

Let it be assumed that the letter "C" of "NWC" is being printed at the time relay 108 is energized. Upon this assumption, the shift arm 94 is in the letter printing position and contacts 101, 102 are open and therefore the circuit for the magnet 68 is not completed. When the code combination for the first figure "2" of "220" is received, the shift arm 94 is moved to the figure printing case shift position closing the contacts 101 and 102 and thereby completing the energizing circuit for the magnet 68. If, instead of printing a letter, the printers were printing a figure when contact 107 closed, the magnet 68 would have energized immediately instead of merely being prepared. Otherwise, the above described operations are the same. Energization of magnet 68 rocks the armature 63 in a counter-clockwise direction moving the pawl 61 idly over the ratchet wheel 60 into engagement with the next tooth thereof. Magnet 68 remains energized until contacts 101 and

102 are opened. These contacts are opened when the shift arm 94 moves from the figure printing position to the letter printing position. In the present example, such movement of switch arm 94 takes place after the code combination for figure "0" of "220" has been received and printed and while the code combination for letter "A" of "ABY" is being transferred.

When the circuit of magnet 68 is broken, the spring 67 rocks the armature lever 63 clockwise and through the pawl 61 operates the ratchet 60, shaft 43, and brush arms 38 and 53 a distance corresponding to one tooth of the ratchet wheel 60. The brushes 39 and 54 are thus moved to the succeeding segments. As the brush 54 is stepped to its new position, it crosses over an insulating strip 55 and in doing so breaks the locking circuit of the relay 108. Relay 108 deenergizes further opening the energizing circuit for magnet 68 so that this magnet will not be again energized until segment 146 bridges brushes 147 and 148.

As the brush 39 moves to the segment 36, it passes insulation 40, thereby unlocking previously energized and locked relay 30. Relay 30 deenergizes and at armature 32 opens the energizing circuit for magnet 20. Magnet 20 releases the member 17 which by action of its spring 19 is rocked clockwise until spring 21 disengages the tape 12 and roller 16 presses against the tape. The tape is now free to be fed in the usual manner following printing operation.

When the brush 39 moves into contact with segment 36, it extends positive battery over brush arm 38, segment 36, common conductor 41, through the winding of relay 25 and conductor 45 to the contact 128. Thus, an energizing circuit for the relay 25 is prepared, but this relay is not energized until the next tape feeding action takes place in the master printer A3, as will be described hereinafter.

The code combination of impulses for "A", which is the first letter of the quotation "ABY1587/8", is accompanied by an unshift impulse inasmuch as the previous character printed was a figure, namely, the figure 0 of the preceding stock quotation NWC220. As hereinbefore described, the transfer operation for transferring the selection from the selector levers to the code disks takes place immediately after printing of the previously selected character. Thereafter in accordance with the transferred selection, a new selection is made. Also, the tape feeding operation takes place immediately after the transfer operation.

Accordingly, in the particular example chosen for purpose of illustration, the selection operation for the letter "A" takes place while the figure "0" is being printed and the transfer operation of the letter "A" selection takes place immediately after the printing of

the figure "0". Transfer operation of the letter "A" selection is followed by a tape feeding operation.

Printing of figure "0" on all three printers is followed by a feeding operation of the tape. Printer A2, the feed mechanism of which has been described as just having been freed, feeds its tape to the next clean space in preparation for printing the letter "A" of the next quotation. The feed mechanism of printer A1 is still free at this time and its tape is fed to the next clean space.

When the tape feeding operation takes place in the master printer A3, the feed bail 119 is rocked in a counter-clockwise direction by the spring 121, as hereinbefore described, and this permits spring 127 to rock switch lever 125 in a counter-clockwise direction thereby closing contacts 128 and 129. Closure of these contacts completes the energizing circuit for the relay 25 previously prepared by the brush 39 coming into engagement with the segment 36 on the distributor 35 and relay 25 is energized. Upon energization of relay 25, it closes a locking circuit for itself at armature 46, this circuit extending from positive battery over brush arm 38, brush 39, segment 36, common conductor 41, through the winding of relay 25, contact 47, armature 46 to ground.

At armature 27, the relay 25 completes an energizing circuit for the magnet 20 of the printer A1, this circuit extending from positive battery over contact 26, armature 27, conductor 28, through the winding of the magnet 20 ground. Magnet 20, upon energization, rocks the bellcrank lever 17 in a counter-clockwise direction thereby moving the pressure wheel 16 away from the tape 12 thereby suppressing further tape feeding operations in this printer. At the same time the spring 21 is moved into engagement with the tape 12 to press the tape against the platform 22. The spring 21 holds the printer tape 12 so that any tendency to creep is overcome. By this time the "0" of "NWC220" has already been printed on printer A1. The characters of the quotation "ABY1587s", now received, are printed by printer A1 but since its tape is not fed they are not spaced from each other and the characters are printed one on top of the other as they are received, as shown in Figure 4. The feed mechanism of printer A2 having, however, been freed, the characters thereon are printed side by side on the tape in the usual manner until the next switching operation.

Although we have described a specific arrangement of our invention, it will be clear to those skilled in the art that it may take on different forms.

We claim:

1. In a unit message system in which each quotation or message comprises a group of characters, a plurality of registers, switching

mechanism, means controlled by said switching mechanism during the receipt of a message of said unit message for preparing to render one of said registers operative and the other of said registers non-operative and means operative at the commencement of the succeeding message for completing said prepared operations.

2. In a unit message system having a plurality of registers only a part of which are operative at one time, said registers being operated in response to unit messages, switching mechanism operative during the receipt of one of said messages for preparing to render the operative registers non-operative and the non-operative registers operative and means controlled by said switching mechanism at the commencement of the succeeding message for completing said prepared operation.

3. In a unit message system in which messages are made up of letters followed by figures, a plurality of registers operating in response to the received messages of which only a part of the registers are operative at one time, switching mechanism responsive to a received figure signal combination for preparing to render the operating registers non-operative and the non-operative registers operative, said switching mechanism being responsive to a completion of the message for completing the prepared operations.

4. In a unit message system in which messages are made up of letters followed by figures, a plurality of registers operating in response to the received messages of which only a part of the registers are operative at one time, switching mechanism responsive to a received figure signal combination for preparing to render the operating registers non-operative and the non-operative registers operative, and means responsive to a completion of the message for completing the prepared operations.

5. In a unit message system in which the messages are made up of letters followed by figures, a plurality of registers operating in response to the received messages of which only a part of the registers are operative at one time, the method of operation which comprises preparing to render the operating registers non-operative when a figure signal of a message is received and completing the prepared operation when the complete message has been received.

6. In a unit message system in which each group of characters comprises a complete message, a plurality of printers of which certain are held operative while the others are non-operative, a switching mechanism comprising a rotating distributor, means controlled by said distributor, a second distributor, circuit connections controlled by said second distributor for rendering one of said printers operative and the other non-opera-

tive and vice versa, rotating means for said second distributor, means whereby said first mentioned means controls said rotating means, means controlled in accordance with the impulse received for operating said rotating means to rotate said distributor to its succeeding contact, means controlled by said second distributor, means operative following the completion of a message for operating said last mentioned means, means controlled by the energization of said last mentioned means for locking one of said printers from operation and means whereby said second distributor in stepping from one to the next of its contacts releases the previously locked printer.

7. In a unit message system in which each group of characters comprises a complete message, a plurality of printers of which certain are held operative while the others are non-operative, a tape for each of said printers, means for stepping said tapes, a switching mechanism comprising a rotating distributor, electro-magnetic means controlled by said distributor, a second distributor, circuit connections controlled by said second distributor for rendering one of said printers operative and the other non-operative and vice versa, a stepping magnet for said second distributor, an electrical circuit for said stepping magnet, means whereby said first mentioned electromagnet means prepares an energizing circuit for said stepping magnet, means controlled in accordance with the impulse received for completing said prepared circuit whereby said stepping magnet means is energized to step said second distributor to its succeeding contact, electro-magnetic means having a circuit including the contacts of said second distributor, means operative during the tape stepping operation of said printers for completing the energizing circuit of said last mentioned electro-magnetic means, means controlled by the energization of said last mentioned electro-magnetic means for locking one of said printers from operation and means whereby said second distributor in stepping from one to the next of its contacts releases the previously locked printer.

8. The method of classifying received intelligence in a telegraph system which consists in automatically preparing, at predetermined intervals during the receipt of a message, to direct the intelligence into one or another predetermined channel and thereafter automatically directing the intelligence into the prepared channel under control of the initial character of the succeeding message in each group of intelligence characters.

9. In a telegraph system wherein the received intelligence is arranged in groups of characters comprising letters followed by figures, the method of classifying said intelligence which consists in automatically

preparing, during the receipt of a message, to direct the groups into different channels and thereafter directing the group to the different channels when the initial letter of the next succeeding group, following the group in which the preparation was made is received.

10. 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, automatically preparing, at any interval during the receipt of a group of characters, to select one instrument upon which the next succeeding group shall be recorded and thereafter causing the initial character of the next group to complete the selection of the instrument previously prepared and preventing other of said instruments from recording the same.

11. In a telegraph system in which the transmitted intelligence is constituted of groups of characters, a plurality of receiving recording instruments, means operative in any interval during the receipt of a group of characters to prepare to render certain of said receiving instruments ineffective to record the next succeeding group of characters and for permitting other of said instruments to record the same, and means operative following the completion of said group of characters for completing said prepared selection.

12. In a telegraph system in which the transmitted intelligence is constituted of groups of characters, a plurality of receiving recording instruments, a periodic means operative in any interval during the receipt of a group of characters to prepare to render certain of said receiving instruments ineffective to record the next succeeding group of characters and for permitting other of said instruments to record the same, and means operative following the completion of said group of characters for completing said prepared selection.

13. 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 the transmitted intelligence, certain of said instruments having means to render the recording function non-operative, means associated with one of said instruments operative during the receipt of a group of characters for preparing to select certain of said instruments to function to record and other of said instruments not to record the intelligence and means operative at the end of the receipt of said groups of characters for completing said prepared selections.

14. In a telegraph system in which the transmitted intelligence is composed of groups of characters, a plurality of receiving instruments each having printing and tape stepping function mechanism, each con-

connected to receive all the transmitted intelligence, certain of said instruments having electro-magnetic means adapted when actuated to render its printing and tape stepping functions non-operative, one of said instruments having means operative during the receipt of a group of characters for preparing to operate one of said electro-magnetic means of one of said instruments and means operative at the termination of said groups of characters for completing said prepared operations.

15. In a telegraph system, a plurality of receiving recording instruments and an editing instrument, each connected to receive all of the transmitted intelligence, said recording instruments each being provided with nullifying means to render the recording functions thereof ineffective, said editing instrument having means connected to each of said nullifying means and operative during the receipt of a group of characters for preparing the operation of one of said nullifying means and the release of another of said nullifying means which was previously operated and means operative at the termination of said groups of characters for completing said prepared operation.

16. In a telegraph system in which the transmitted intelligence is composed of groups of characters, a plurality of receiving instruments, each connected to receive all of the transmitted intelligence and having printing and tape stepping function mechanisms, certain of said instruments having electro-magnetic means adapted when actuated to render the printing function ineffective and to render the tape stepping function non-operative, one of said instruments having means operative during the receipt of a group of characters to prepare for operation of one or the other receiving instruments and means operative upon the completion of said groups of characters for completing said prepared operation.

17. 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 instrument having printing mechanism positioned by said selecting mechanism and means actuated by said circuit controlling means operative during the receipt of a group of characters for preparing one of said printing mechanisms for operation and for preparing to render the other of said printing mechanisms ineffective and means operative following the completion of said groups of characters for operating said prepared operations.

18. In a printing telegraph system having a plurality of printing instruments connect-

ed to record the received intelligence, the method of assigning different portions of the intelligence to different instruments which consists in preparing one of said instruments for printing at any interval during the receipt of a group of characters and operating said prepared instruments by the succeeding groups of characters.

19. In a stock quotation system, in which the stock quotation comprises a complete message consisting of letters and figures, a plurality of printers operable in accordance with received code combinations of impulses, each of said printers having tapes on which selected characters are printed in accordance with the received code combinations, means for stepping said tapes following the printing of the characters, overlap means in said printers whereby a previously selected character is being printed while code combinations of impulses are being received for the next succeeding character, means for transferring the selections received during the printing of the previously selected character to the printing mechanism for printing the newly selected character immediately after the printing of the previously selected character, and thereafter stepping the tape to the next printing position, a distributor, electro-magnetic means periodically energized over contacts including said distributor, means following the energization of said electro-magnetic means for locking said electro-magnetic means in energized position independently of said distributor, a second distributor mechanism comprising a first and second distributor head, a stepping magnet for said second distributor, a circuit for said stepping magnet including the contact controlled by said first mentioned electro-magnetic means, means operative during the receipt of figure characters of any stock quotation message and operative following the energization of said first mentioned electro-magnetic means for completing the energized circuit to said stepping magnet, means controlled by the energization of said stepping magnet for preparing to step said second distributor to the succeeding contacts, means whereby said stepping magnet circuit is opened during the receipt of a letter character whereby said second distributor stepping means is deenergized to step its distributor to its succeeding contact, electro-magnetic means individual to one of said printers, each associated with certain of the contacts of the first head of said second distributor, other electro-magnetic means individual to another of said printers and associated with other contacts on the first distributor head of said second distributor whereby the circuit for said electro-magnetic means is prepared by said distributor in accordance with its position, means operative during the stepping operation of the tape for completing the energizing circuit of

one of said electro-magnetic means in accordance with the position of the second distributor, electro-magnetic means individual to each of said printers and controlled in accordance with the distributor electro-magnetic means energized for locking its associated printing mechanism from operation, means including said second distributor for deenergizing the previous energized electro-magnetic means when the distributor moves from one segment to the next and means whereby the second distributor head of the second distributor releases said first mentioned electro-magnetic means.

20. In a stock quotation system having a plurality of printers each having a tape stepping means therefor, the method of switching messages from one to another printer which comprises preparing the switching operation during the receipt of a message and completing the switching operation following the stepping of the tapes after the last character of the preceding message has been received.

21. In a stock quotation system having a plurality of printers each having a tape stepping means therefor, the method of switching messages from one to another printer which comprises preparing the switching operation during the receipt of a message, initiating switching operation during the receipt of the figure characters of the message, completing the switching operation at the end of the message and locking the printer from which switching has taken place following the stepping of the tape after the last character of the message has been received.

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

23. In a unit message system in which each message comprises characters from different groups, switching mechanism, counting means operating upon the receipt of a predetermined number of characters, and means responsive to said counting means, operative upon the completion of the last counted character, to actuate said switching mechanism, a plurality of registers for receiving said messages, means whereby only one of said registers is operative at one time, and means whereby said switching mechanism switches from the one to another of the registers.

24. In a unit message system in which each message comprises characters from different groups, switching mechanism, counting means operating upon the receipt of a predetermined number of characters, and means responsive to said counting means, operative

upon the completion of the last counted character, to actuate said switching mechanism, a plurality of registers for receiving said messages, means whereby only one of said registers is operative at one time, and means whereby received switching mechanism renders said operative register non-operative and renders another of said registers operative.

In testimony whereof we affix our signatures.

ROBERT F. DIRKES.
ARTHUR L. POMEROY.