

Feb. 1, 1938.

L. M. POTTS

2,107,044

TWO-COLOR RIBBON MECHANISM

Filed Aug. 5, 1936

2 Sheets-Sheet 2

FIG. 6

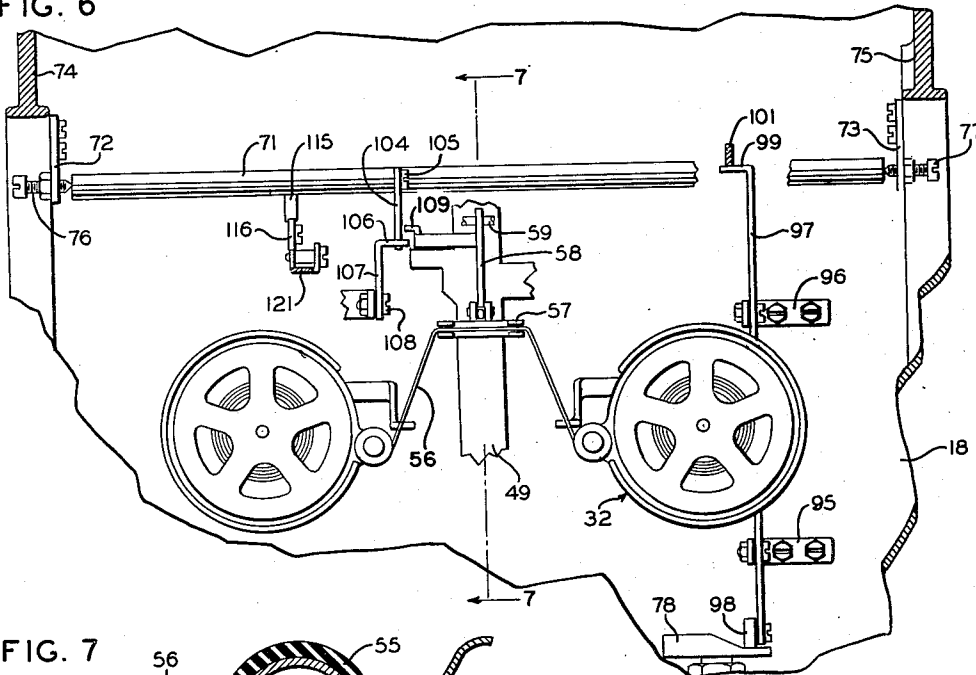


FIG. 7

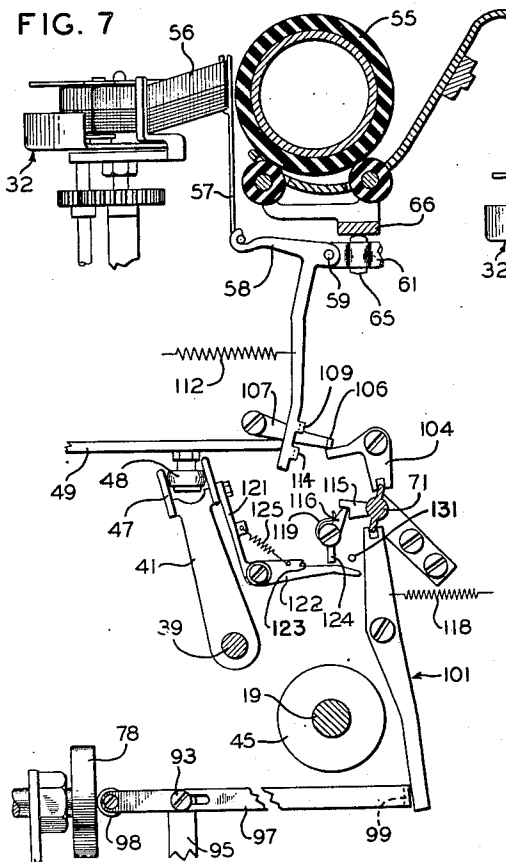
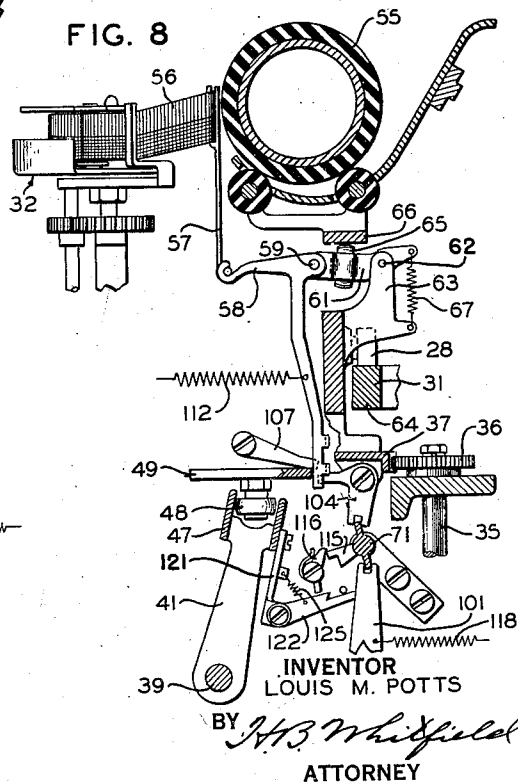


FIG. 8



INVENTOR
LOUIS M. POTTS

BY *H.B. Whitfield.*
ATTORNEY

UNITED STATES PATENT OFFICE

2,107,044

TWO-COLOR RIBBON MECHANISM

Louis M. Potts, Evanston, Ill., assignor to Teletype Corporation, Chicago, Ill., a corporation of Delaware

Application August 5, 1936, Serial No. 94,350

12 Claims. (Cl. 178—25)

This invention pertains to printing telegraph systems and apparatus and more particularly to apparatus for recording in different colors messages transmitted and received.

5 The principal object of the invention is to provide, in a combination transmitting and recording apparatus, a simple and inexpensive mechanism responsive to the transmitting apparatus to function differently under conditions of trans-
10 mission and reception whereby transmitted and received messages will be distinctively recorded.

Another object of the invention is to provide for the oscillation of the inking ribbon capable of printing in distinctive colors to afford visibility
15 of the record irrespective of the position of the platen, and to vary, under the control of the transmitting mechanism, the extent of such oscillation.

20 The above and other objects of the invention are achieved by rendering the ribbon shift mechanism controllable by a cam associated with the keyboard transmitter so that the cam, during message transmission, will govern the shifting of the two color ribbon mechanism auto-
25 matically to effect printing in a certain characteristic and distinctive color. During message reception, the cam remains quiescent and the ribbon shift mechanism is operated to a limited extent only so as to present the portion of the
30 ribbon employed for printing incoming messages. On the other hand, during message transmission, at which time a home record is made, the cam rotates cyclically, and once during each cycle the ribbon is oscillated a greater
35 amount than during message reception to present the portion of the ribbon employed for printing outgoing messages.

Specifically, the present invention is arranged to be applied to apparatus such as that disclosed
40 in Patent No. 1,904,164 granted April 18, 1933 to S. Morton et al., which relates to a combination transmitting and receiving apparatus wherein the platen is stationary and the type carriage is movable. The ribbon shift mechanism, accord-
45 ing to the invention herein disclosed, is controlled by a supplementary guide bar disposed parallel to the printing bail guide. The supplementary guide is rockable on its longitudinal axis to either of two positions dependent upon
50 the operation or non-operation of the transmitter shaft. The ribbon shift bell crank lever is controlled directly by the pull bar bail in such manner that, each time the pull bar bail is reciprocated to operate a type bar, the ribbon shift
55 bell crank lever is rocked so as to raise the

ribbon into the path of the oncoming type bar. When the pull bar bail is restored after reciprocation, the ribbon shift bell crank lever is caused to lower the ribbon out of the path of the type bar to render the printed record visible. In ac-
5 cordance with the present invention, the ribbon shift mechanism has been arranged to render it adaptable to use with a two-color ribbon, wherein the elevation to which the ribbon is shifted by the ribbon shift mechanism is determined by
10 the colored portion of the ribbon from which a record is to be made. It is the function of the supplementary guide to control the amount of elevation of the ribbon, without affecting the visibility of the record after printing. Further-
15 more, the portion of the ribbon shift bell crank lever which cooperates with the pull bar bail is designed so as to function similarly for printing either upper or lower case characters.

A better understanding of the invention may
20 be had from the following description, taken in conjunction with the accompanying drawings, wherein like reference characters designate similar parts throughout the several views, and in which,

25 Fig. 1 is a simplified circuit diagram of a telegraph system to which the present invention is applicable;

Fig. 2 is a transverse cross-sectional view of the printer in accordance with said patent in
30 which the device according to the present invention is incorporated;

Fig. 3 is a cross-sectional view of the transmitting mechanism;

Fig. 4 is a fragmentary plan view of the trans-
35 mitting cam shaft;

Fig. 5 is a fragmental view illustrating one of the operative positions of the device according to the invention;

Fig. 6 is a plan view of the printer according
40 to the said patent with parts broken away to show the application of the present invention thereto;

Fig. 7 is a fragmental cross-sectional view taken approximately on line 7—7 of Fig. 6 in
45 which the arrangement according to the present invention is shown in a position for printing lower case characters of an outgoing message, and

Fig. 8 is a fragmental cross-sectional view simi-
50 lar to Fig. 7 in which the present invention is shown in a position for printing upper case characters of an outgoing message.

Having reference to Fig. 1 which is a simplified diagrammatic view of a telegraph system to 55

which the present invention is applicable, the system comprises a loop circuit 10 interconnecting two telegraph stations 11 and 12 which may have identical equipment. It is, of course, understood that other stations may be included in this loop circuit. Station 11 is shown as comprising a receiving portion 13, including a line relay 14, and a transmitting portion 15, including a transmitting distributor indicated symbolically by the transmitting contacts 16. From this circuit it will be seen that the line relay 14 is operated when the transmitting contacts 16, at any of the stations included in the loop, are operated.

The particular embodiment of the invention shown comprises a printer mechanism such as is shown in U. S. Patent No. 1,904,164, a transmitting mechanism similar to that shown in U. S. Patent No. 1,595,472, and a shifting mechanism for the color ribbon particularly adapted for cooperation with these mechanisms. The unit comprises a base 18 for mounting of the printer and the keyboard transmitter. The printer is driven through a main shaft 19, Figs. 2 and 7, and the transmitter through a main shaft 21 (Fig. 4) both shafts being driven in any desirable manner from a motor (not shown).

Referring to Figs. 2 and 6, the printing apparatus to which the present invention is applied comprises a typing unit (shown generally in section in Fig. 2) which includes a primary selecting mechanism (not shown) controlled by the line relay 14 and a secondary selector or selector vane assembly indicated generally as 22. The selector vane assembly 22 controls, through a series of bell crank levers 23, a corresponding series of arcuate code bars 24 carried in a movable type carriage. As set forth in Patent No. 1,904,164, this type carriage, indicated generally as 25, is movable longitudinally with respect to a stationary platen 55, on rollers 27 and 28 co-operable with track members 29 and 31 respectively. The type carriage 25 also carries a ribbon supply and said mechanism indicated generally as 32.

A spacing mechanism (more fully described in Patent No. 1,904,164) is associated with the main shaft 19 and controls, through gears 33 and 34, shaft 35, gear 36 and rack 37 (Fig. 2), the movement of type carriage 25 to form character spaces, tending in this movement to wind up the carriage return spring mechanism indicated generally as 38.

Positioned in operative relation with and parallel to the main operating shaft 19 is an auxiliary shaft 39 on which are carried various mechanisms, for example, the printing ball 41 and the printing ball operating arm 42. The printing ball 41 is actuated by a printing spring 43 in proper timed relation in the operative cycle and is controlled by the operating lever 42 mounted on the shaft 39. One end of lever 42 carries a follower roller 44 which cooperates with a printing ball operating cam 45 carried on shaft 19. At the upper end of lever 42 is carried an adjustable striker 46 which cooperates with printing ball 41.

Follower roller 44 rides on the high part of the cam 45 and in consequence thereof printing ball 41 is held to the right (as viewed in Fig. 2) by striker 46 on lever 42. Printing ball 41 is constantly under the influence of printing spring 43 which tends to rotate ball 41 in a counterclockwise direction. Therefore, as the printing cam 45 revolves it releases lever 42, thereby allowing

spring 43 to pull the printing ball 41 toward the left, at the same time imparting motion in the same direction to lever 42 through striker 46 thereby tending to hold the follower roller 44 in contact with the periphery of cam 45. This rotative movement is terminated when follower roller 44 engages the low part of cam 45. As the cam 45 continues to rotate, the roller 44 rides up onto the high part of the cam causing ball 41 to be rotated through lever 42 and striker 46 in a clockwise direction against the tension of spring 43.

Printing ball 41 is provided with a pair of blades 47 which are spaced apart to provide a guideway for a roller 48 carried on a pull bar ball 49. Through this interconnection, the movement of ball 41 is imparted to the pull bar ball 49 causing the latter to reciprocate cyclically. When the code bars 24 are set in a predetermined permuted arrangement according to a character selection, an alignment of notches occurs which permits one of the pull bars 51 to drop therein, causing shoulder 52 to cooperate with edge 53 of the pull bar ball 49 so that upon the reciprocation of ball 49, the pull bar 51 is actuated to the left to cause, through the rack and gear relationship therewith, a type bar 54 to be rotated clockwise sharply against the platen 55. As the type bar 54 is operated, the inking ribbon 56 is automatically interposed between the type face and platen, and after the printing is completed and the type bar is returned to its unoperated position, the ribbon is again withdrawn, exposing the printing record to view. The ribbon 56 is carried in a ribbon guide member 57 which, in turn, is carried at the end of the horizontal arm of a ribbon shift bell crank lever 58 which is pivoted at 59 to one end of a lever 61, which in turn is pivoted at 62 to a bracket 63 integral with portion 64 of the framework of the type carriage 25. Lever 61, between pivotal points 59 and 62, is designed to carry a roller 65 which is adapted to have contactual relation with the bottom side of a rail 66 (carried on the platen assembly 26) due to the action of a spring 67 distended between lever 61 and a projection on bracket 63.

Spring 67 tends to rotate lever 61 in a clockwise direction (as viewed in Fig. 2) about pivot 62 so that when the platen 55 is reciprocated between its upper case and lower case ("letters" and "figures") positions through the medium of rod 113, as described in Patent 1,904,164, roller 65 will constantly remain in contact with the rail 66 and lever 58 will thus be automatically reciprocated vertically therewith.

The depending arm of lever 58 is operably associated with the pull bar ball 49 so that the reciprocative motion of ball 49 will cause the oscillation of bell crank lever 58 about fulcrum 59 whether the platen 55 be in its "letters" or "figures" position. Thus, it will be noted that when ball 49 is in its normal position (shown in Fig. 2), the bell crank 58 will hold the ribbon 56, by reason of guide 57, in its down or lower position to effect visibility of the printed character, and when ball 49 moves toward the left for a printing operation, the ribbon 56 will be raised to printing position due to the clockwise movement of bell crank lever 58 about pivot 59 by spring 112.

In accordance with the present invention, the amount of vertical reciprocation of ribbon guide 57 is varied to compensate for the particular colored portion of the ribbon from which it is

desired to make a record; that is, when a two-color ribbon is employed wherein incoming messages are to be printed in one color or from one portion of the ribbon, and outgoing messages are to be printed from the other portion of the ribbon, it is contemplated to control automatically the selection of the portion of the ribbon used. To effect this control of the inking ribbon, a supplementary guide bar is provided which comprises a wing bar 71 which extends between brackets 72 and 73 mounted on side frames 74 and 75 respectively of the typing unit. The wing bar 71 is pivotally supported by means of pilot screws 76 and 77 associated with the ends thereof. By means of the wing bar 71 the ribbon shift control mechanism is effective for every carriage spacing position of the type carriage 25. The wing bar 71 is rockable to two effective positions under the control of a cam 78, associated with the transmitting mechanism shown in Fig. 4.

The transmitting mechanism as illustrated in Fig. 3 comprises a series of transmitting contacts 16 which are controlled by a corresponding series of goose-neck levers 79 which in turn are operated by a corresponding series of transmitting cams 81. Associated with the levers 79 are a set of blocking levers 82 pivoted on a common shaft 83, the lower ends of which are articulated to individual code bars 84 which are permutably settable by means of key levers 85. Upon a predetermined permutable setting of code bars 84 through the instrumentality of code notches thereon, the bars 84 will assume their right or left positions according to the particular key lever operated, which arrangement of the code bars 84 will effect a corresponding position of levers 82 to either prevent or permit, through shoulders 86, the goose-neck levers 79 to respond to the cams 81 to control in turn, through the contacts 17, the transmission of a character code combination corresponding to the key lever 85 depressed.

As described in Patent No. 1,595,472, the depression of a key lever 85 also effects the release of a throw-out clutch arm 87, whereupon a grab clutch 88 is rendered engageable and operable through the continuously rotating shaft 21 to impart thereby, rotation to cams 16 and a gear 89 through a single cycle. Associated with the transmitting mechanism and arranged parallel to the shaft 21 is a shaft 91 which carries a gear 92 meshed with gear 89 to impart rotation to shaft 91 and the cam 78 carried thereon. Thus, upon each actuation of key lever 85, Fig. 3, the transmitting shaft 21 is rotated to effect transmission of a code signal, and simultaneously therewith shaft 91 is rotated to control, through cam 78 and a linkage to be presently described, the oscillation of the ribbon 56 to present the desired colored portion thereof to the printing area.

Cooperating with cam 78 and mounted slidably on bearings 93 and 94 carried on brackets 95 and 96, respectively, is a horizontal bar 97. Mounted on the left end of bar 97 (Fig. 2) is follower roller 98 which cooperates with cam 78. The right end of bar 97 is provided with a laterally disposed portion 99 which urges against the lower arm of lever 101 suitably pivoted at 102 in the printer structure. The upper end of lever 101 is forked so as to embrace the lower wing of bar 71.

The upper wing of bar 71 cooperates with the forked end of a depending arm of bell crank member 104 pivotally carried at 105 by the type

carriage 25. It is thus observed that bell crank 104 is movable with the carriage 25 and is slidably articulated to the wing bar 71. The horizontal arm of bell crank 104 cooperates with a laterally disposed projection 106 (Fig. 6), of a lever 107 pivotally mounted at 108 on the type carriage 25. Lever 107 rests upon the bell crank 104 due to gravity, or it may be spring actuated. When the wing bar 71 assumes its counterclockwise position, as shown in Fig. 2, the bell crank 104 acts to hold the projection 106 of lever 107 in the path of laterally disposed projection 109 of projection 111 on the ribbon shift bell crank lever 58. With this particular arrangement of levers 104 and 107 and wing bar 71, the reciprocation of pull bar bail 49 during a printing operation will permit bell crank lever 58 to move clockwise a limited amount (Fig. 2) under the action of its spring 112, or until projection 109 is arrested by projection 106 (Fig. 6), this movement being sufficient to raise the ribbon 56 so that its upper color area is presented for printing. The foregoing is the organization of parts for printing incoming messages in the lower case or "letters" position.

In order to print incoming messages in the upper case or "figures" position, the platen assembly 26 is caused to rock in a clockwise direction by means of a pull rod 113, Fig. 2, in a manner described in Patent No. 1,904,164. When the platen assembly is so actuated, the roller 65 is caused to remain in contact with the rail 66 by means of spring 67, which causes lever 61 to rotate clockwise to raise the pivot 59, thus raising the bell crank lever 58 a corresponding amount to bring the projection 114 into alignment with the projection 106 of lever 107, as shown in Fig. 8. It is thus seen that the same limited clockwise movement of bell crank lever 58 is obtained in either the upper or lower case position of the platen for printing incoming messages on the upper portion of inking ribbon 56.

Having reference again to Figs. 2 and 6, the wing bar 71 carries a shouldered arm 115 which cooperates in a manner hereinafter described with a latch 116 suitably pivoted at 117 in the printer frame. Upon rotation of face cam 78, during the transmission and printing of outgoing messages, the follower roller 98 will ride up onto the high portion thereof, whereby bar 97 will be actuated rightwardly against the action of a spring 103. The rightward movement of bar 97 will impart counterclockwise movement to lever 101 against the action of its spring 118 which in turn will cause wing bar 71 to rock clockwise to the position shown in Fig. 7, thus bringing the projection 115 into a position to be latched up by the latch portion 116, a spring 119 acting to bring the latch 116 into latching engagement with the shouldered portion 115. As shown in Fig. 5, the actuation of wing bar 71 to its clockwise position causes bell crank 104 to be rocked counterclockwise so that its horizontal arm is lowered sufficiently to permit projection 106 on lever 107 to escape the projection 109 on lever 58. Thus, when the pull bar bail 49 is actuated leftwardly, the ribbon shift bell crank lever 58 will be permitted to rotate clockwise under the action of its spring 112 a greater amount (than when it was blocked by projection 106) as shown in Fig. 7, so that the lower colored area of ribbon 56 may be presented to the printing position for recording outgoing messages.

To print outgoing messages in the upper case

or "figures" position, the platen assembly 26 is rocked clockwise by its pull rod 113, as previously mentioned, bringing the lower projection 114 on lever 58 into the position shown in Fig. 8 so that when the levers 104 and 107 are caused to assume their respective positions, as shown in Fig. 7, by means of rocking the wing bar 77, to its clockwise position, the lower projection 114 will escape the projection 106 of lever 107 thus permitting the bell crank lever 58 to be actuated to its fullest amount to bring the lower colored portion of ribbon 56 into the printing position.

It has been noted that when the wing bar 77 has been actuated to its clockwise position, it has become latched in that position by the cooperation of latch 116 with shouldered portion 118. By this means the setting of the ribbon shift control mechanism is retained during the printing operation irrespective of the duration of the cycle of operation of the transmitting mechanism. As a character is caused to be printed by the oscillation of printing ball 41, and the corresponding reciprocation of pull bar ball 41 thereby, mechanism is effective upon the return of the printing ball 41 to its normal non-operated position to unlatch the member 116 from the shouldered portion 118 to permit the wing bar 77 to assume its counterclockwise position due to the action of spring 118 on lever 101. To effect this disengagement, there is provided on the printing ball 41, a bracket 121 on the lower end of which is pivoted an arm 122 having a shoulder 123 (Fig. 7) to cooperate with a depending portion 124 on latch 116. Arm 122 normally tends to rotate in a counterclockwise direction toward the portion 124 by a spring 125. When the printing ball 41 assumes its clockwise position, the shoulder 123 assumes the position with respect to portion 124 shown in Fig. 2, and when printing ball 41 is actuated to its counter-clockwise position, shoulder 123 is brought into effective cooperative relation with arm 124, as shown in Fig. 7, so that when the printing ball 41 is again returned to its clockwise position shoulder 123 will abut projection 124 to cause, during the final portion of the clockwise movement of the printing ball 41, the latch 116 to be rotated sufficiently in a counterclockwise direction against the action of its spring 118 to become disengaged from the shouldered portion 118 to free the wing bar 77 to permit its response through lever 101, to spring 118. Substantially concurrently therewith, lever 122 is deflected by pin or stud 131 so as to effect the disengagement of shoulder 123 from depending arm 124 (Fig. 7).

General operation

During the reception of incoming messages, the transmitting mechanism shown in Figs. 3 and 4 remains idle and the follower roller 98 resides in the lower portion of the face cam 78 thus permitting lever 101, through its spring 118, to hold the wing bar 77 in its counterclockwise position as shown in Figs. 2 and 8. Upon receipt of a code signal, the rotation of the main shaft 19 is initiated in proper timed relation with the operation of the selector mechanism, as fully described in Patent No. 1,904,164. The rotation of shaft 19 causes, through cam 48 and operating arm 42, the printing ball 41 to be oscillated to cause, through pull bar ball 49, the operation of a type bar 54 to effect printing on the upper portion of the inking ribbon 56. Because of the fact that, although the movement of the ribbon shift bell crank lever 58 is governed by the movement

of full bar ball 49, nevertheless, the amount of movement of lever 58 is controlled by the levers 104 and 107 which act through lateral portion 106 to block the movement of lever 58 through its projection 109 or 114 (depending upon whether upper or lower case characters are being printed), this limited movement permitting the ribbon 56 to be elevated only sufficiently to bring the upper portion thereof into printing position.

When outgoing messages are to be printed, the transmitting cam shaft 21 is rotated cyclically in response to each operation of a key lever 85, and correspondingly, cyclic movement is imparted through gears 89 and 92 (Fig. 4) to the face cam 78, thus for each cycle of rotation of cam 78 the wing bar 77 is rocked through the instrumentality of bar 97 and lever 101, wing bar 77 being latched in its clockwise position until the printing of the character has been effected, whereupon it is unlatched by the lever 122 carried on the printing ball 41. The rocking of the wing bar 77 to its clockwise position each time a key lever is depressed and a character is transmitted causes, through lever 104, the shifting of the end or portion 106 from its blocking position to permit, through the escapement of portion 109 or 114, a fuller movement of bell crank lever 58 to bring the lower portion of the ribbon 56 into printing position.

It is, of course, understood that this application is intended to cover not only the specific embodiment disclosed but also sufficient changes or modifications as come within the spirit of the invention or scope of the following claims.

What is claimed is:

1. In a telegraph apparatus, a platen, a shiftable ribbon carrying mechanism, means to shift and return the ribbon carrying mechanism irrespective of the position of the platen to reveal the record at the point of printing after each printing operation, transmitting means, and means controlled by said transmitting means to vary the degree of shifting of the ribbon carrying mechanism.

2. In a telegraph apparatus, a movable type carriage, ribbon carrying mechanism mounted on said carriage, means for shifting said ribbon, transmitting means, and means cooperating with said carriage and controlled by said transmitting means to cause said ribbon shifting means to operate differently when said transmitting means is operative than when said transmitting means is inoperative.

3. In a telegraph system, a telegraph line, a plurality of stations each comprising a transmitting portion for sending outgoing signals over said line and a receiving portion for producing a characteristic record of said outgoing as well as incoming signals, a carriage in each receiving portion movable to form character spaces, a rockable guide member arranged parallel to the path of movement of said carriage, means associated with said transmitting portion to control the degree of movement of said guide, and means controlled by said guide for making the record of said outgoing and incoming signals characteristically different.

4. In a telegraph apparatus, sending means, receiving means, a carriage movable in accordance with character spaces, a rockable guide member arranged parallel to the path of movement of said carriage, means associated with said sending means to control the rockability of said guide, and means controlled by said guide for making the records governed by said sending

means and said receiving means distinguishable from one another.

5 5. In a recorder, a movable type carriage, a ribbon carrying means mounted on said carriage, an intermittently operable member mounted on said carriage and adapted to perform the recording operations, means cooperating with said member to effect oscillation of said ribbon to provide visibility of the record as it is made, and means effective under certain predetermined conditions to vary the extent of oscillation of the ribbon.

10 6. In a recorder, a movable type carriage, a ribbon carrying means mounted on said carriage, an intermittently operable member mounted on said carriage and adapted to perform recording operations, a shiftable platen, means to render said first mentioned means shiftable with said platen to maintain its cooperative relation therewith, means cooperating with said member to effect oscillation of the ribbon to provide visibility of the record as it is made in either the shift or unshift positions of said platen, and means effective in either position of said platen to vary the extent of oscillation of the ribbon.

20 7. In a recorder, a movable type carriage, mechanism in said carriage for effecting recording operations, a platen, shift mechanism for controlling said platen, ribbon carrying mechanism mounted on said carriage, means mounted on said carriage to perform recording operations, means cooperating simultaneously with said recording mechanism and said platen to effect oscillation of said ribbon irrespective of the position of said platen to provide visibility of the record as it is made, and means effective under certain operating conditions to vary the extent of oscillation of the ribbon.

25 8. In a telegraph apparatus, a platen, ribbon carrying mechanism, means to effect oscillation of the ribbon carrying mechanism irrespective of the position of the platen to provide visibility of the record, transmitting means, and means controlled by said transmitting means to vary the

extent of oscillation of the ribbon carrying mechanism.

9. In a telegraph apparatus, a transmitting device, a recording device, a ribbon operating mechanism, a device to alter the operation of the ribbon operating mechanism, means operated by the transmitting device to condition the ribbon operating mechanism for altered operation, and means effective after each recording operation to return the ribbon mechanism to its original condition.

10. In a telegraph apparatus, printing mechanism, a platen having a plurality of shift positions, ribbon carrying mechanism, means to effect oscillation of the ribbon irrespective of the position of the platen to provide visibility of the record, transmitting means, means controlled by said transmitting means to alter the operation of said first-recited means, means to retain said first-recited means in altered position, and means controlled by said printing mechanism to return said first-recited means to its original position.

11. In a telegraph apparatus, a printing bail, a ribbon supporting mechanism, means for moving said mechanism for each printing operation in response to operation of said printing bail, a transmitter, and means operated from the transmitter for causing further movement of said mechanism upon operation of said bail to effect printing in a distinctive color.

12. In a telegraph apparatus, a printing bail, a ribbon supporting mechanism, means for moving said mechanism for each printing operation in response to movement of the printing bail, a transmitter for transmitting signal impulses, a cam operated in timed relation to the transmission of signal impulses by said transmitter, and mechanism positioned by said cam for causing said ribbon supporting mechanism to be moved an additional amount on the operation of the printing bail.

LOUIS M. POTTS.