

May 29, 1951

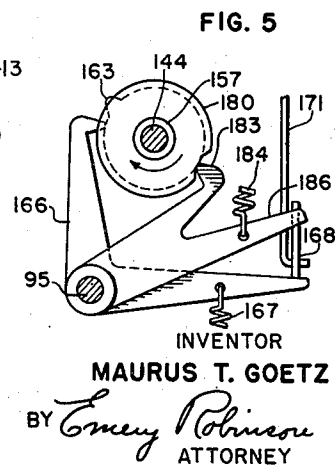
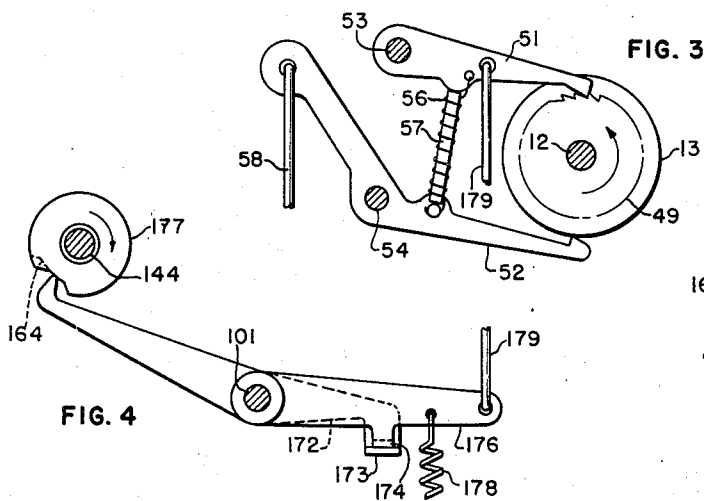
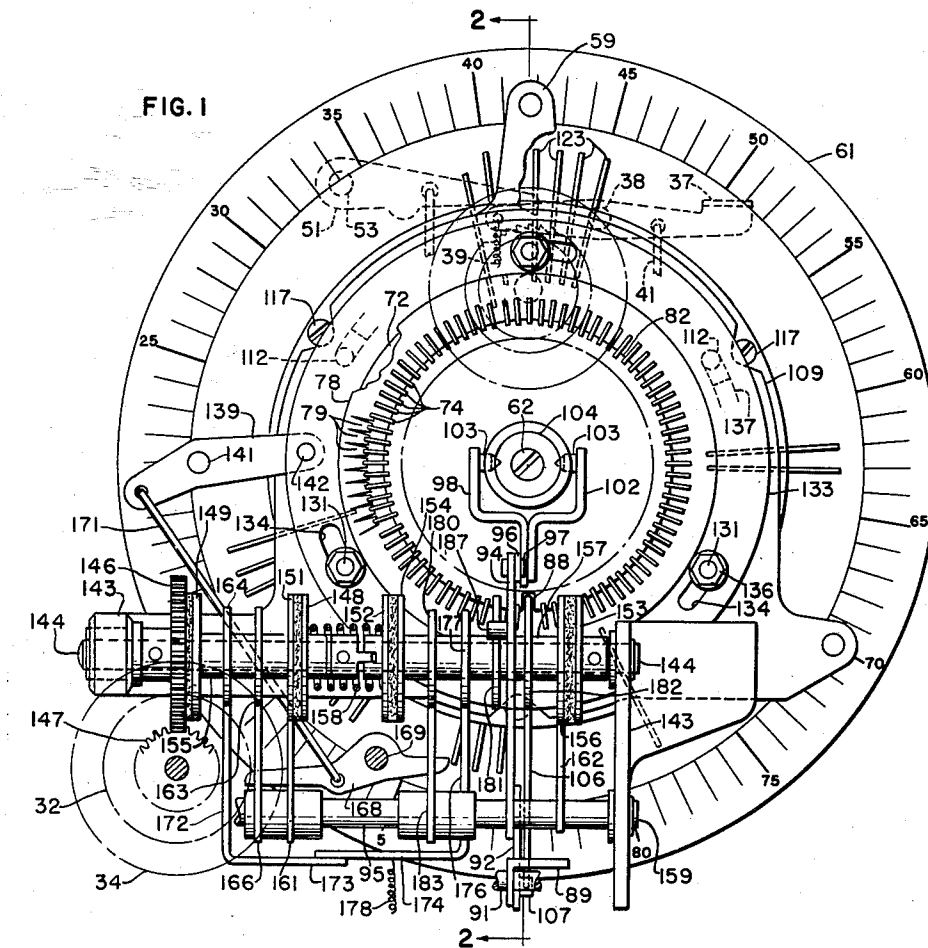
M. T. GOETZ

2,554,903

VERTICAL TABULATION MECHANISM FOR TELEGRAPH PRINTERS

Filed March 7, 1950

2 Sheets-Sheet 1



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May 29, 1951

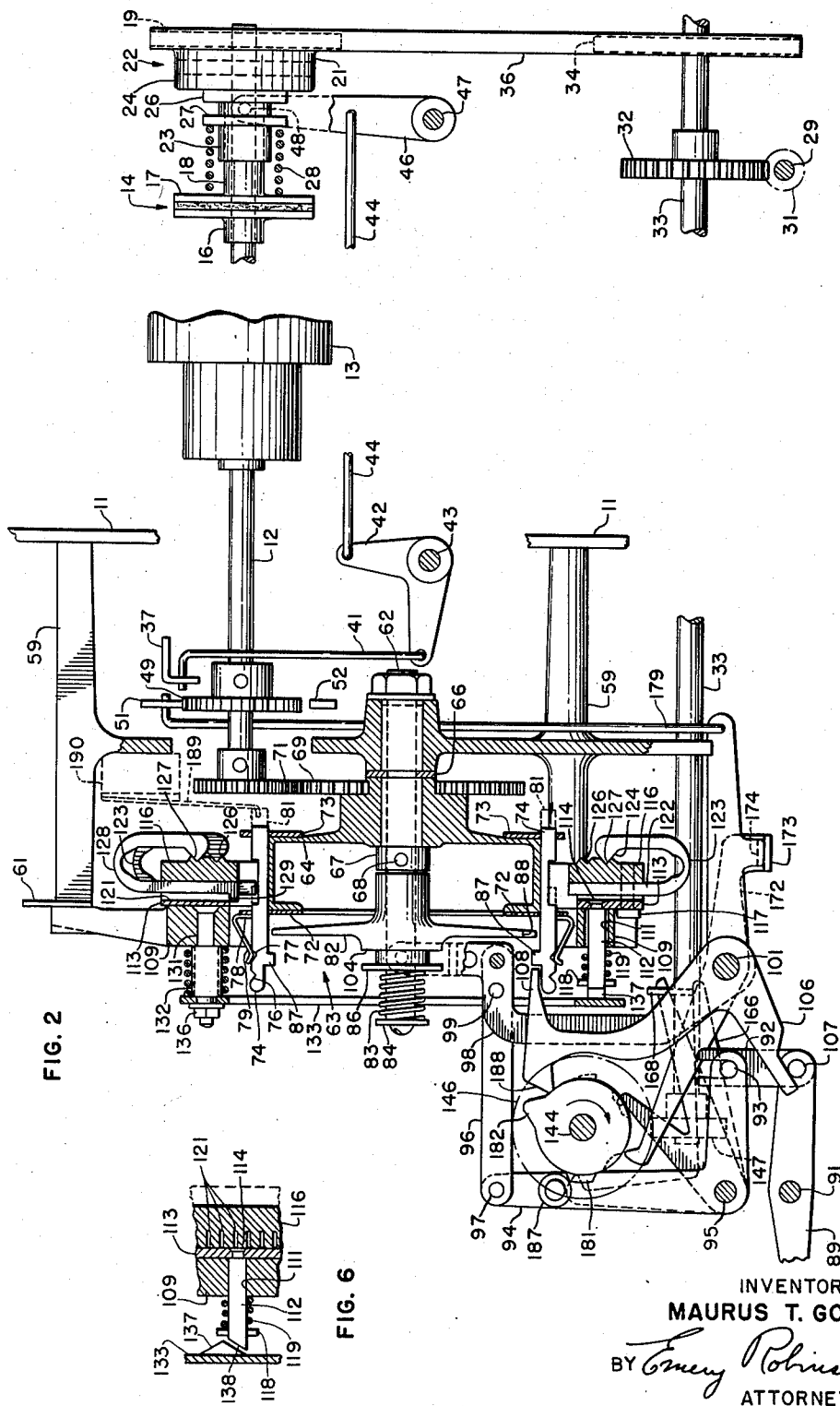
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VERTICAL TABULATION MECHANISM FOR TELEGRAPH PRINTERS

Filed March 7, 1950

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,554,903

VERTICAL TABULATION MECHANISM FOR
TELEGRAPH PRINTERSMaurus T. Goetz, Chicago, Ill., assignor to Tele-
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Application March 7, 1950, Serial No. 148,131

12 Claims. (Cl. 178—25)

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The present invention relates to printing telegraph apparatus and more particularly to apparatus applicable to telegraph printers for enabling such printers to feed out a message form from any position of the printer platen and to perform vertical tabulation functions, that is, to advance the printer platen to a next subsequent predetermined line position.

The present invention is particularly applicable when it is desired to receive telegraph messages on forms of uniform length or upon a web which is to be severed, after the message printing operation, into forms of uniform length. In the present disclosure, in order to avoid any possible misconception, the following terminology will be used: "Form out" or "form out operation" refers to the operation of advancing the platen rotatably from any position to a position whereby the first line to receive printed telegraph signals, of the next subsequent form to be moved into printing position, is aligned in printing position. In other words during a form out operation, an old form is moved completely out of printing position and a new form is moved to a position such that its first line is in printing position. "Vertical tabulation" refers to the operation of rotating the platen from any position to the next pre-set stop position which may be any amount of rotation up to that occurring during a form out operation.

The principal object of the present invention is to provide an apparatus applicable to standard telegraph printers for enabling such printers to perform vertical tabulation and form out operations.

It is another object of the present invention to provide a vertical tabulation and form out mechanism whereby forms of different lengths may be handled.

A further object of the invention is to provide a vertical tabulation and form out mechanism having manually settable stops corresponding to each line position of a form of the maximum length to be used by the printer.

A further object of the invention is to provide a vertical tabulation and form out mechanism wherein the platen is rotated rapidly and continuously upon release for rotation to thereby accomplish vertical tabulation and form out operations rapidly, thereby saving valuable line time.

In the present invention the platen is power driven through a friction clutch. As escapement mechanism is actuated during line feed, vertical tabulation, and form out operations to thereby release the platen for rotation. A stop disc or

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ring carrying a plurality of manually settable stops circumvents a control disc having a plurality of control pins. Both the stops and the control pins correspond to line positions of the platen. The control ring is geared to rotate with the platen, and the control pins, which rotate with the control ring, when set in operable position are of such configuration as to engage the stops which have previously been moved to operative position. This engagement causes the platen to stop rotating during either a vertical tabulation or form out operation. During a vertical tabulation operation, upon the stopping of the rotation of the platen due to engagement of an operably positioned control pin with a stop, other means are provided for enabling the control pin to pass the stop so engaged. During a form out operation the platen rotates until the control pin in operable position engages a form out stop. After the platen stops rotating upon completion of a form out operation the control pin which engaged the form out stop is moved to inoperative position in the control disc and the control pin in zero position, which corresponds to the first print receiving line of a form, is moved to operable position.

It is therefore apparent that another object of the invention is to provide a form out and vertical tabulation mechanism wherein the control means thereof, which rotates with the platen, need not be returned to a zero position after the completion of a form out operation.

The above and many other objects and advantages of the present invention will become apparent, particularly to those skilled in the art, from the following detailed description of the invention when read in conjunction with the annexed drawings wherein:

Fig. 1 is an overall view of the invention showing the principal features thereof;

Fig. 2 is a sectional view taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary view of the escapement mechanism for controlling the rotation of the platen;

Fig. 4 is a detail view of the mechanism for actuating the platen escapement mechanism during form out and vertical tabulation operations;

Fig. 5 is a detail view of the mechanism for actuating the stop pin skip mechanism; and

Fig. 6 is a detail view of the stop disc mechanism.

It is contemplated that the present invention will be applied to a telegraph printer of the type

disclosed in the patent to Morton et al., No. 1,904,164, and also that the mechanism for rotating the platen will be of the type disclosed in the copending application of E. T. Baldwin Serial No. 66,733, filed December 22, 1948, now U. S. Patent No. 2,536,528 of January 2, 1951. Both the Morton et al. patent and the Baldwin application are hereby incorporated into the present disclosure by reference and for a detailed description of the printer and platen rotating mechanism contemplated to be used with the present invention, reference should be had to said patent and copending application. It is not to be understood that the present invention is inapplicable to any other type of printer, as the Morton et al. printer is mentioned for purposes of illustrating a typical widely used type of telegraph printer to which the invention is applicable.

Referring now to the drawings and first, specifically to Fig. 2, a fragmental portion 11 of the telegraph printer frame is shown. A platen shaft 12, mounted rotatably in the frame by means not shown, carries a platen 13 securely mounted thereon. A friction clutch 14 has its driven portion 16 secured to the platen shaft 12 and its drive portion 17 secured to a sleeve 18 rotatably mounted upon the platen shaft 12. A toothed wheel or pulley 19 is rotatable about the shaft 12 and has a drive portion 21 of a friction type grab clutch 22 affixed thereto. A sleeve 23 rotatable about the sleeve 18 carries a driven portion 24 of the clutch 22. A collar 26 having a peripheral groove 27 is secured to the sleeve 23 and a compression spring 28, in pushing against the collar 26 and the drive member 17, retains both clutches 14 and 22 in driving condition. Power for rotating the platen 13 is derived from a continuously rotating shaft 29. The shaft 29 carries a gear 31 which meshes with a gear 32 secured to a rotatable shaft 33. The shaft 33 carries a toothed wheel or pulley 34 over which a chain or belt 36 passes. The belt 36 also passes over the pulley 19 to thereby supply rotative power to the platen drive mechanism.

In order to facilitate the positioning of message forms around the platen 13 and particularly to facilitate the proper alignment of the forms when a new supply thereof is being inserted into the printer, the following means are provided. A manually operable lever 37, mounted suitably on a pivot bolt 38, is urged continuously in a counterclockwise direction by a spring 39. A link 41 secured pivotally to the lever 37 connects the lever 37 with a bell crank 42 mounted pivotally on a suitable pivot bolt 43. The other arm of the bell crank 42 has a link 44 secured pivotally thereto which is also connected pivotally to a bifurcated lever 46 suitably mounted on a pivot bolt 47. The bifurcated lever 46 has a suitable stud 48 secured to each arm thereof, each of which studs 48 are designed to ride in the peripheral groove 27. When the manually operable lever 37 is depressed, the link 41 is lowered thereby pivoting the bell crank 42 counterclockwise. When the bell crank 42 is pivoted in this manner the link 44 is pulled to the left (Fig. 2) and the bifurcated lever 46 moves the collar 26 and driven clutch part 24 to the left against the urging of the compression spring 28. With the driven clutch part 24 disengaged from the drive member 21, the platen 13 may be rotated freely to thereby permit a new supply of forms to be readily aligned around the platen 13.

It is apparent that during normal operation of the printer, that is, when printing operations

are taking place, the platen is held stationary. Under this condition the drive member 17 of the friction clutch 14 slips relative to the driven member 16 inasmuch as the continuously rotating power shaft 29 constantly urges the platen 13 forward rotatively. Rotation of the platen 13 is controlled by an escapement mechanism shown in Fig. 3.

The mechanism for controlling the rotation of the platen 13 will now be described. The platen shaft 12 has a ratchet 49 rigidly secured thereto, with which a pair of pawls 51 and 52 cooperate. The pawl 51 is mounted pivotally on a suitable shaft 53 and the pawl 52 is mounted pivotally on a shaft 54. The two pawls 51 and 52 are continuously urged towards one another by a spring 56 but are retained apart by a rod 57 mounted within the coils of the spring 56 and abutting the pawls 51 and 52. During line feed operations a line feed link 58 secured suitably to the pawl 52 is moved downwardly and then returned upwardly to the position shown. During the downward movement of the line feed link 58 the pawl 52 is pivoted counterclockwise about its pivot shaft 54. This counterclockwise motion of the pawl 52 is transferred to the pawl 51 by means of the rod 57. The pawl 51 is thereby lifted from engagement with the ratchet 49. As the pawl 51 becomes disengaged from the ratchet 49, the pawl 52 has been moved into engagement with the ratchet. When the ratchet 49 is retained stopped by the pawl 51, the stopping or effective surface of the pawl 52 is opposite a point midway between two teeth on the ratchet and therefore upon disengagement of the pawl 51 from the ratchet, the ratchet is permitted to rotate an amount equal to approximately one half the distance between two ratchet teeth or until a tooth engages the pawl 52. Thereafter as the line feed link 58 is again raised the pawl 52 is pivoted clockwise out of engagement with the ratchet 49. During this movement of the pawl 52 the spring 56 is effective to move the pawl clockwise into engagement with the ratchet 49. Because of the fact that the operative surfaces of the pawls 51 and 52 are out of alignment by an amount substantially equal to one half the distance between two adjacent ratchet teeth, as the pawl 52 becomes disengaged and the pawl 51 becomes engaged with the ratchet 49 the ratchet is permitted to rotate another half step counterclockwise. These two half steps the ratchet 49 is permitted to move cause the platen 13 to be advanced the distance between two successive printing lines. Therefore upon actuation of the line feed link 58 in response to a line feed signal the platen 13 is rotated to advance the print receiving web one line feed. It has not been considered necessary to show or describe the mechanism for actuating the line feed link 58 as this may be accomplished in any well known manner such as the means used and shown in the aforementioned patent to Morton et al. or application of Baldwin.

The printer frame 11 has an auxiliary frame 59 suitably secured thereto for supporting the vertical tabulation and form out control mechanism. Rigidly secured to the auxiliary frame 59 is a name plate 61 which is etched with markings indicative of line positions of the platen 13. Also rigidly mounted in the auxiliary frame 59 is a bolt 62 which supports the rotatable control mechanism indicated generally by the reference numeral 63.

A control ring or disc 64 is mounted on the bolt

62, being free to rotate thereon but being held in a single plane by a spacer washer 66 and a collar 67 secured to the bolt 62 by a set screw 68. The control ring 64 has a gear 69 secured thereto which meshes with a gear 71 rigidly secured to the platen shaft 12. The ratio of the gears 71 and 69 is such that the gear 69 makes a complete revolution when the platen 13 has been advanced eighty-four line spaces. There is nothing fixed about this ratio and it could be anything else without departing from the spirit of the present invention. This particular ratio of eighty-four line spaces of the platen 13 per revolution of the control ring 64 has been chosen merely because the ordinary forms contemplated to be used with the present invention contain eighty-four or less line spaces.

The control ring 64 has a pair of rings 72 and 73 secured thereto, each ring 72 or 73 having apertures (not shown) spaced uniformly therearound and within which apertures control pins 74 are slidable longitudinally. It will also be noted that there are eighty-four control pins, that is, a control pin 74 is provided for corresponding line spaces of the platen 13. Each control pin 74 has a pair of notches 76 and 77. A circular spring plate 78 is secured to the ring 72 and has an individual spring finger 79 corresponding to each control pin 74. The spring fingers 79 are of such configuration as facilitates seating themselves in the notches 76 and 77 of the control pins 74. The pressure of the spring fingers 79 is sufficient when they are seated in the notches 76 or 77 to retain the control pins positioned longitudinally, however a longitudinal thrust imparted to one of the control pins 74 may be sufficient to move such control pin and thereby unseat the retaining spring finger 79. Actually in the operation of the apparatus the control pins 74 will occupy either the position thereof as shown, being retained in such position by cooperation between the spring fingers 79 and the notches 77, or one of the control pins 74 may be moved to the position represented by the dotted line 81 which represents the selected position of the control pins 74.

A disc 82 is mounted on the bolt 62, however the disc 82 is not rotatable, but only slidable on the bolt 62. The disc 82 is shown in its normal position and is movable to the left against the action of a compression spring 83 mounted on the bolt 62 between a washer 84 and a collar 86 secured to the disc 82. It is to be noted that the periphery of the disc 82 is very close to the control pins 74 and the disc 82 is designed to engage a shoulder 87 on any control pin 74 occupying its dotted position 81 and thereby return such control pin 74 to its normal position during the leftward movement of the disc 82. It is to be further noted that the disc 82 has a slot 88 in its zero position and therefore a selected control pin 74 in the zero position is not restored to its non-selected position during the leftward movement of the disc 82.

The disc 82 may be moved to the left manually and the means for accomplishing such operation will now be described. A manually depressible lever 98 is mounted pivotally on a shaft 91 and has a bifurcated link 92 secured pivotally thereto. The bifurcated lever 92 carries between its arms a stud 93 secured to a bell crank 94. The bell crank 94 is mounted pivotally on a shaft 95 and is secured pivotally to a lever 96 by means of a bolt 97 and to insure stability of the lever system, the lever 96 is secured pivotally to a vertical

lever 98, by means of a bolt 99. The lever 98 is mounted pivotally on a shaft 101 and has an arm 102 rigidly secured thereto, the arm 102 and the upper part of the lever 98 being bent so as to form a U. At the top of the lever 98 and the arm 102 a pair of lugs 103 are provided which ride within a groove 104 in the collar 86 of the disc 82. When the manual lever 98 is depressed the link 92 is raised, which in turn pivots the bell crank 94 counterclockwise (Fig. 2). Movement of the bell crank 94 in this manner draws the lever 96 to the left, which in turn pivots the lever 98 counterclockwise about its pivot shaft 101. When the lever 98 moves in this manner the two lugs 103 move the disc 82 to the left against the action of the spring 83. As has been stated previously, when the disc 82 is moved to the left, it engages the shoulder 87 of any control pin 74 previously moved to its dotted position 81 and returns such control pin 74 to its leftward position. However, due to the slot 88 in the disc 82 in the zero position the control pin 74 in zero position is not moved by the disc 82.

A bell crank lever 106 mounted pivotally on the shaft 101 has an arm designed to be engaged by a stud 107 protruding from the manually depressible lever 98. The bell crank lever 106 has an operating foot 108 in alignment with the shoulder 87 on the control pin 74 in zero position. When the manual lever 98 is depressed, the stud 107 is raised and in so moving engages the arm of the bell crank 106 thereby pivoting it clockwise on the shaft 101. When the bell crank 106 moves clockwise in this manner the operating foot 108 thereof engages the shoulder 87 on the control pin 74 in zero position and thereby moves this control pin 74 to the dotted position 81. It will therefore be noted that whenever a control pin 74 in zero position is selected by being moved to its dotted position 81, any other control pin 74 having been selected previously is returned simultaneously to its normal unselected position.

The following is a description of the stop mechanism. A ring 109 rigidly secured to the auxiliary frame 59 is provided for the purpose of mounting the stop mechanism. The ring 109 has three transverse holes 111 for receiving and slidably mounting three posts 112. The posts 112 have a circular ring 113 bolted thereto by bolts 114 and another circular ring 116 is rigidly secured to the ring 113 by three bolts 117. Each of the posts 112 has a collar 118 secured thereto. A compression spring 119 around the post 112 abuts the collar 118 and the ring 109 to retain the rings 113 and 116 in their leftward position as shown. The ring 116 has a plurality of radial slots 121 which are spaced angularly equal distances from one another so as to correspond to line positions of the platen 13. Within the slots 121, the left arms 122 of a plurality of manually settable U-shaped stops 123 are slidable, it being contemplated that a separate stop 123 is provided for each radial slot 12. Each of the stops 123 has a detent 124 which, because of the spring like characteristic of the stops 123, is urged continuously to the left in order to seat itself conveniently in one or the other of a pair of V-shaped grooves 125 and 127 surrounding the ring 116. Any stop 123 with its detent in the groove 126 occupies its selected position and when so positioned will engage the control pin 74 in selected position to thereby stop rotation of the platen 13. It will be noted that a form out stop 128 has a foot 129 although it is just like any other stop 123 in all other respects. The

purpose of the foot 129 on the form out stop 128 will become apparent in the description of the operation of the apparatus.

The ring 109 carries three bolts 131 each of which has a spacer sleeve 132 therearound for retaining a rotatable slidable ring plate 133 in the proper plane. The ring plate 133 has three elongated apertures 134 through which the bolts 131 pass and which allow a slight rotational movement of the ring plate 133. A nut 136 obviously retains the ring plate 133 and spacer sleeve 132 in the proper position on each of the bolts 131. The ring plate 133 has three cams 137 mounted thereon which are designed to cooperate with a beveled cam surface 138 on each of the posts 112. When the ring plate 133 is moved counterclockwise, due to the clockwise pivotal movement of a lever 139 mounted pivotally on a fixed pivot 141 and secured pivotally to the ring plate 133 by means of a pivot bolt 142, the cams 137 engage the cam surfaces 138 on the posts 112 and cam the posts 112, rings 113 and 116, and stops 123 to the right against the action of the springs 119, whereby a selected control pin 74 is permitted to pass a selected stop pin 123. This operation occurs after the platen 13 has been stopped, upon completion of a vertical tabulation function as well as during an entire form out function when it is necessary that the selected control pin 74 pass by all vertical tabulation stops 123.

A suitable pair of brackets 143 support rotatably a shaft 144 to which is secured a gear 146, the gear 146 meshing with a gear 147 mounted on the continuously rotating shaft 33. It is therefore apparent that the shaft 144 is a continuously rotating shaft. The gear 146 has a clutch face (not shown) and this clutch face together with a driving member 148, which is keyed to the shaft 144, comprise the driving portion of a clutch having driven members 149 and 151 which are affixed to a vertical tabulation cam sleeve 155. A pair of driving members 152 and 153 are keyed to the shaft 144 and cooperate with a pair of driven members 154 and 156 to supply rotative power to a form out cam sleeve 157. Both driving members 148 and 152 are slidable longitudinally on the shaft 144 and a compression spring 158 urges the member 148 to the left and the member 152 to the right to thereby cause clutching engagement between all driving and cooperating driven members on the shaft 144. The brackets 143 mount the pivot shaft 95 stationarily.

A lever 161 mounted pivotally on the shaft 95 normally cooperates with a tooth (not shown) on the driven member 151 to retain the vertical tabulation cam sleeve 155 stationary, but upon receipt of a vertical tabulation signal, the lever 161 is actuated by any well known means, to release the tooth on the member 151 and thereby to permit the vertical tabulation cam sleeve 155 to make a complete revolution whereupon the lever 161 again engages the tooth on the driven member 155 to stop further rotation of the sleeve 155. The means for actuating the lever 161 may be electrical or mechanical or may consist of means similar to the function mechanisms of the type disclosed in the aforementioned patent to Morton et al. A lever 162, similar to the lever 161, is mounted pivotally on the shaft 95 and cooperates with a tooth (not shown) on the driven member 156 to normally retain the form out cam sleeve 157 stationary. When a form out signal is received, means of

any well known type withdraw the lever 162 from the tooth on the driven member 162 to thereby permit the form out cam sleeve 157 to rotate through a single revolution.

The vertical tabulation cam sleeve 155 has a control mechanism slide cam 163 and a platen release cam 164. The control mechanism slide cam 163 has a cooperating follower bell crank 166 which is urged continuously against the cam 163 by means of a tension spring 167 (Fig. 5). The horizontal arm of the bell crank 166 engages a pivotal lever 168 when actuated by the high part of the cam 163 and thereby causes the lever 168 to pivot slightly clockwise about its pivot point 169. When the lever 168 is pivoted clockwise in this manner a link 171 secured pivotally thereto is pushed upwardly and leftwardly and, as the link 171 is secured pivotally to the lever 139, the lever 139 causes the ring plate 133 to rotate counterclockwise slightly. It will be recalled that when the ring plate 133 is rotated in this manner, the cams 137 engage the cam surfaces 138 on the posts 112 to thereby cam the stops 123 out of engagement with the selected control pin 74. This operation whereby the selected control pin 74 is allowed to pass by a selected stop 123 occurs very near the end of the cycle of rotation of the cam 163 as is apparent from an inspection of Fig. 5.

The platen release cam 164 has a cooperating follower 172 which is mounted pivotally on the shaft 101 and which has a horizontal arm 173 that is adapted to engage and lift a horizontal arm 174 on a follower 176 which cooperates with a platen release cam 177 on the form out cam sleeve 157. The follower 176 has a spring 178 which tends to pivot both followers 176 and 172 clockwise to retain them in engagement with their cooperating cams 177 and 164 respectively. When the cam 164 on the vertical tabulation cam sleeve 155 rotates so as to bring the high part of the cam 164 opposite the follower 172, the follower 172 is pivoted counterclockwise and its arm 173, in engaging the arm 174, lifts the follower 176 slightly. The lifting of the follower 176 against the action of its spring 178 causes a link 179, secured pivotally to the follower 176, to be raised slightly. The link 179 is secured pivotally to the upper escapement pawl 51 which is lifted from engagement with the ratchet 49 at this time. The line feed vertical link 58 is stationary at this time and will not permit the spring 56 to raise the lower pawl 52, so consequently both pawls 51 and 52 are held disengaged from the ratchet 49 simultaneously. Therefore the platen 13 is free to rotate forward.

It will be noted that the cam 164 is effective to allow the platen 13 to rotate forward freely very early in the cycle of rotation of the vertical tabulation cam sleeve 155. It will also be noted that the cam 163 is effective to allow the selected control pin 74 to pass by a selected stop 123 very near the end of the cycle of rotation of the cam sleeve 155. The ratio between the speed of rotation of the platen 13 and the cam sleeve 155 or shaft 144 is such that the entire length of the longest form contemplated to be used will be fed forward by the platen 13 before the high part of the cam 163 engages the follower 166. Therefore the selected control pin 74 will always engage a selected stop 123 to stop rotation of the platen 13 prior to the lateral displacement of the stops 123 due to the operation of the cam 163.

When the platen 13 is stopped by reason of the selected control pin 74 engaging a selected stop

pin 123, the effective surface of the pawl 51 is midway between two teeth on the ratchet 49. Towards the end of the revolution of the vertical tabulation cam sleeve 155 when the follower 172 falls to the low part of the cam 164, the pawl 51 falls into engagement with the ratchet 49 midway between two adjacent teeth thereon. After this engagement of the pawl 51 with the ratchet 49, the selected stop pin 123 in engagement with the selected control pin 74, is moved out of engagement with such control pin. Due to the fact that the effective surface of the pawl 51 is midway between two teeth on the ratchet 49, the ratchet is permitted to rotate one half the distance between two teeth thereon upon disengagement of the selected stop 123 from the selected control pin 74 or, in other words, until the effective surface of the pawl 51 engages the next tooth on the ratchet. During this movement of the ratchet 49 the platen 13 is, of course, also moved a half step to bring it into the proper line position.

The form out cam sleeve 157 has four cams which include in addition to the platen release cam 177, a control mechanism slide cam 180, a control pin release cam 181, and a control pin set cam 182. Each of these four cams 177, 180, 181, and 182 rotate with the form out cam sleeve 157 to thereby perform their various functions.

As was stated heretofore, the platen release cam 177 causes its follower 176 to pivot slightly counterclockwise when the cam 177 is rotated with the sleeve 157 in response to a form out signal. When the follower 176 pivots counterclockwise in this manner the link 179 is raised and disengages the pawl 51 from engagement with the ratchet 49, which permits rotation of the platen 13. This lifting of the pawl 51 from engagement with the ratchet 49 upon receipt of a form out signal, as has already been made apparent, is accomplished in substantially the same manner as it was lifted in response to a vertical tabulation signal.

The control mechanism slide cam 180 (shown more clearly in Fig. 5) has a follower 183 mounted pivotally on the shaft 95 and urged towards the cam 180 continuously by means of a spring 184. The follower 183 has an arm 186 which overlies the lever 168. When the cam 180 rotates so as to present its high portion to the follower 183, the follower 183 is moved so that the arm 186 engages and pivots the lever 168 clockwise (Fig. 1). It will be recalled that when the lever 168 is pivoted clockwise, the link 171 is moved leftwardly and upwardly and in turn pivots the lever 139 clockwise about its pivot 141. The lever 139, in pivoting clockwise, causes the ring plate 133 to be rotated counterclockwise slightly which in turn moves the stops 123 to the right (Fig. 2) out of engagement with the selected control pin 74.

The control pin release cam 181 cooperates with a follower roller 187 mounted rotatably on the bell crank 94. When the high portion of the cam 181 engages the follower roller 187 (shown more clearly in Fig. 2) the bell crank 94 is pivoted counterclockwise, the stud 93 rising in the slot of the bifurcated lever 92, however, the bell crank 94 moving in the same manner as when actuated by the manual depression of the lever 89. When the bell crank 94 is pivoted counterclockwise, it will be recalled that it pulls the link 96 to the left which in turn causes the lever 93 and its arm 102 to withdraw the disc 82 (Fig. 2) and the selected control pin 74 to the left into unselected position.

The control pin set cam 182 cooperates with a

follower portion 188 on the bell crank 106. It will be recalled that when the manual lever 89 is depressed, the bell crank 106 is moved clockwise about its pivot shaft 101 whereby the operating foot 108 on the bell crank 106 engages and moves the control pin 74 occupying zero position from unselected to selected position. The effect of the engagement between the high portion of the control pin set cam 182 and its follower 188 is the same as when the bell crank 106 is moved manually, that is, the control pin 74 in zero position is moved to selected position by the operating foot 108 on the bell crank 106.

The sequence of operation of the various cams on the cam sleeve 157 will now be described. A form out signal causes the clutch lever 162 to release the form out cam sleeve 157 for a single revolution. At substantially the same point in the rotation of the form out cam sleeve 157 and very early in the cycle of rotation thereof, the low part of the platen release cam 177 and the low part of the control pin release cam 180 present themselves to their followers 176 and 183 respectively. Therefore very early in the cycle of rotation of the form out cam sleeve 157, the platen 13 commences rotating and the vertical tabulation stops 123 are moved to the right (Fig. 2) out of alignment with the selected control pin 74. The platen 13 and control mechanism 63 consequently are permitted to rotate freely without interruption by selected stops 123. The movement of the discs 113 and 116 to the right under control of the control mechanism slide cam 180 is not so far to the right as to move the foot 129 on the form out stop 128 out of alignment with the selected control pin 74. Therefore it is apparent that the control mechanism 63 is free to rotate during a form out operation until the selected control pin 74 strikes the foot 129 on the form out stop 128.

After the control pin 74 strikes the form out stop 128, but in the same cycle of rotation of the form out cam sleeve 157, the follower 176 drops to the low part of the platen release cam 177 and consequently the pawl 51 drops against the ratchet 49 midway between two teeth. At substantially the same point in the form out operation cycle that the pawl 51 drops against the ratchet 49, the high part of the control pin release cam 181 presents itself to the follower roller 187. When the roller 187 rides up the high portion of the cam 181, it will be recalled that the disc 82 is moved to the left to thereby withdraw the selected control pin 74 from selected position and to disengage it from the form out stop 128. Because of the fact that the escapement pawl 51 has already been dropped into engagement with the ratchet 49 by the time that the selected control pin 74 is withdrawn from engagement with the stop 128, the withdrawal of the control pin 74 does not mean the platen 13 is again free to rotate. When the selected control pin 74 becomes disengaged from the form out stop 128, the platen 13 is only free to rotate an amount equal to approximately one half the distance between two teeth on the ratchet 49 whereupon the effective surface of the pawl 51 engages a tooth on the ratchet 49 to retain it in a stopped condition.

At substantially the same time or slightly later than the presentment of the high portion of the control pin release cam 181 to its follower 187 in the rotational cycle of the form out cam sleeve 157, the follower 188 on the bell crank 106 rides up and over the peak of the control pin set cam

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132 to cause the operating foot 108 to engage and selectively position the control pin 74 occupying zero position. After the new control pin 74 is moved to selected position the follower 189 rides to the low part of the cam 182 and momentarily later the clutch lever 162 is effective to stop further rotation of the cam sleeve 157.

A contactor 190 having an operating lever 189 is shown schematically as being fixed to the frame 59. When the arm 189 is engaged by the selected control pin 74 a contact (not shown) in the contactor 190 is closed or opened as may be necessary. It is contemplated that a plurality of contactors 190 and operating levers 189 may be affixed to the frame 59, the operating levers 189 of which will be operated upon being engaged by the selected control pin 74. Further these contactors 190 may readily be made adjustable so that the operating levers 189 thereof may be actuated when the selected control pin 74 occupies any desired rotational position. The contactors 190 may therefore be used for such things as turning on and off satellite printers or reperforators, controlling numbering circuits, stored messages, or actuating other desired operations. Since the rotational position of the selected control pin 74 corresponds to the line position of a form around the platen 13, these other functions, such as turning on and off satellite printers, will be performed when corresponding line positions in successive forms are fed into printing position.

The following is a detailed description of the operation of the present invention. A web of forms is manually positioned around the platen 13, and by the aid of the manual lever 37, which is provided to enable the release of the platen, the web is positioned with the first line of the first form in printing position. If the vertical tabulation stops 123 and form out stop 128 are not already properly positioned the operator manually depresses vertical tabulation stops 123 as determined by the name plate 61, corresponding to each line position on the forms on which it is desired to commence printing a group of intelligence. The operator also inserts the form out stop 128 in the aperture 121, as determined by the name plate 61, which corresponds to the first line position in the next preceding form. It is necessary for the proper functioning of the apparatus that all stops 123, other than those in the positions corresponding to the line positions on the form where printing of groups of intelligence is to be commenced, be withdrawn to unselected position with their detents engaging the groove 127. Upon completion of the setting of the vertical tabulation stops 123 and form out stop 128, the operator depresses the manually operable lever 89 which actuates the bell crank 106 to move the control pin 74 in zero position into selected position, and also causes the disc 82 (Fig. 2) to be withdrawn leftwardly thereby returning any previously selected control pin 74 to unselected position. The apparatus is therefore conditioned properly for receiving signals and responding thereto including vertical tabulation and form out signals.

For purposes of the present description of the operation of the invention it will be assumed that the forms are seventy five line spaces in length and that the forms are divided into various print receiving portions, the first lines of which are lines 0, 20, 35, 45, 60, and 65. Therefore vertical tabulation stops 123 in positions (as

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determined by the name plate 61) 20, 35, 45, 60, and 65 and the form out stop 128 in position 75 will all have been moved to selected position with their detents engaging the groove 126.

Incoming message signals are received and actuate the printer in the normal manner. Assuming that after five lines of intelligence have been received a vertical tabulation signal is received. In response to the vertical tabulation signal, the lever 161 is actuated to release the vertical tabulation cam sleeve 155 for rotation. The platen release cam 164 actuates its follower 172 which causes the pawl 51 to release the ratchet 49 and platen 13 for rotation. The platen 13 rotates until the selected control pin 74 strikes the vertical tabulation stop 123 occupying position 20. Thereafter the pawl 51 drops against the ratchet 49 with the effective surface of the pawl 51 midway between two teeth on the ratchet 49. The control mechanism slide cam 163 is then effective to movement of the discs 113 and 116, and stops 123 and 128 to the right (Fig. 2) so that the selected control pin 74 becomes disengaged from the vertical tabulation stop 123 in position 20. The platen 13 and ratchet 49 are able to rotate one half a step until the effective surface of the pawl 51 stops them by engaging the next tooth on the ratchet 49. Last in the cycle of rotation of the vertical tabulation cam sleeve 155, the lever 161 is effective to stop further rotation of the cam sleeve 155. The platen 13 is then retained by the pawl 51 in a position with the twentieth line of the form in printing position. After a few lines of printing have been received it will be assumed that a form out signal is received.

In response to the form out signal the lever 162 releases the form out cam sleeve 157 for rotation. During the rotation of the cam sleeve 157 and early in the cycle thereof the platen release cam 177 is effective to cause the release of the platen 13 for rotation and the control mechanism slide cam 180 is effective to cause the vertical tabulation stops 123 to be moved out of alignment with the selected control pin 74. The platen 13 therefore rotates freely until the selected control pin 74 strikes the foot 129 on the form out stop 128. Thereafter the pawl 51 drops against the ratchet 49 with the effective surface of the pawl 51 midway between two teeth on the ratchet 49. The control pin release cam 181 is then effective to cause the movement of the disc 82 to the left (Fig. 2) which withdraws the selected control pin 74 to unselected position, and at substantially the same point in the cycle the control pin set cam 182 is effective to cause the operating foot 108 to move to the right and thereby move a new control pin 74 into selected position. When the previously selected control pin 74 is withdrawn from engagement with the form out stop 128 the platen 13 merely rotates one half a step whereupon the effective surface of the pawl 51 engages the next tooth on the ratchet 49 and thereby retains the platen 13 stopped with the first line of the new form in printing position.

When it is desired to feed out one or more blank forms it is only necessary that successive form out signals actuate the printer. Further there is no idle waiting time for the control mechanism 63 to return to an initial position due to the fact that a new control pin 74 is selected after each form out operation.

The present disclosure represents but one embodiment of the invention and it is contemplated

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plated that other embodiments and modifications will be designed which do not depart from the spirit or scope of the present invention.

What is claimed is:

1. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to line feed signals for causing line to line advancement of said platen by said rotating means, a plurality of selectable pins rotatable with said platen, means responsive to a form out signal for causing said rotating means to advance said platen an indeterminate amount, a selected one of said selectable pins being effective upon rotation of said platen by said rotating means to a predetermined position for stopping further rotation thereof whereby an old message form is fed out and a new message form is fed into printing position, and other means effective upon the stopping of rotation of said platen by said selected selectable pin for withdrawing said selected selectable pin to unselected position and setting a new selectable pin in selected position to thereby control the feeding out of said new message form in response to a subsequent form out signal.

2. In an apparatus for controlling the advancement of message forms around a telegraph printing platen, means for rotating said platen, means responsive to line feed signals for causing line to line advancement of said platen by said rotating means, a plurality of selectable pins rotatable with said platen, means responsive to a form out signal for causing said rotating means to advance said platen an indeterminate amount, a selected one of said selectable pins being effective upon rotation of said platen by said rotating means to a predetermined position for stopping further rotation thereof whereby an old message form is fed out and a new message form is fed into printing position, means effective upon the stopping of rotation of said platen by said selected selectable pin for withdrawing said selected selectable pin to unselected position, and other means effective substantially simultaneously with the withdrawal of said selected selectable pin for setting a new selectable pin in selected position to thereby control the feeding out of said new message form in response to a subsequent form out signal.

3. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to line feed signals for causing line to line advancement of said platen by said rotating means, means responsive to vertical tabulation signals or form out signals for causing free advancement of said platen by said rotating means, a plurality of individually selectable control pins rotatable with said platen, a circular stop unit having a plurality of selectable vertical tabulation stops and a form out stop, said form out stop being set in a position corresponding to a first print receiving line of a message form, selected ones of said vertical tabulation stops being set in positions corresponding to other print receiving lines of said message form, said vertical tabulation and form out stops being effective normally to stop rotation of said platen by blocking a selected control pin, means responsive to a vertical tabulation signal upon engagement between said selected control pin and one of said vertical tabulation stops for enabling said selected control pin to pass the engaging vertical tabulation stop, means responsive to a form out

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signal for enabling said selected control pin to pass all of said selected vertical tabulation stops, and means effective in response to a form out signal upon engagement between said selected control pin and said form out stop for withdrawing said selected control pin to unselected position and setting a new selectable control pin in selected position to thereby control the feeding of a new message form in response to vertical tabulation and form out signals.

4. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to line feed signals for causing line to line advancement of said platen by said rotating means, means responsive to vertical tabulation signals for causing free advancement of said platen by said rotating means, a plurality of individually selectable control pins rotatable with said platen, a circular stop unit having a plurality of selectable vertical tabulation stops, selected ones of said vertical tabulation stops being set in positions corresponding to print receiving lines of said message form, said vertical tabulation stops being effective to stop rotation of said platen by blocking a selected control pin, and means responsive to a vertical tabulation signal upon engagement between said selected control pin and one of said vertical tabulation stops for enabling said selected control pin to pass the engaging vertical tabulation stop.

5. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to line feed signals for causing line to line advancement of said platen by said rotating means, means responsive to vertical tabulation signals for causing free advancement of said platen by said rotating means, a plurality of individually selectable control pins rotatable with said platen, a circular stop unit having a plurality of selectable vertical tabulation stops, selected ones of said vertical tabulation stops being set in positions corresponding to print receiving lines of said message form, said vertical tabulation stops being effective to stop rotation of said platen by blocking a selected control pin, and means responsive to a vertical tabulation signal and effective after engagement between said selected control pin and one of said vertical tabulation stops for momentarily displacing said circular stop unit axially a predetermined amount to thereby enable said selected control pin to pass the engaging vertical tabulation stop.

6. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to a form out signal for causing free advancement of said platen by said rotating means, a plurality of individually selectable control pins rotatable with said platen, a circular stop unit for retaining a form out stop selectively positioned to correspond to the end of one form and the beginning of the next form, the selectively positioned form out stop being effective to stop rotation of said platen by said rotating means with a new form in printing position by blocking a selected control pin, and means effective in response to a form out signal upon engagement between said selected control pin and said selectively positioned form out stop for withdrawing said selected control pin from selected position to enable further rotation of said platen and for setting a new selectable control pin in selected

position to thereby control the feeding out of a new form in response to a subsequent form out signal.

7. In an apparatus for controlling the advancement of message forms around a telegraph printer platen, means for rotating said platen, means responsive to a form out signal for causing free advancement of said platen by said rotating means, a plurality of individually selectable control pins rotatable with said platen, a circular stop unit for retaining a form out stop selectively positioned to correspond to the end of one form and the beginning of the next form, the selectively positioned form out stop being effective to stop rotation of said platen by said rotating means with a new form in printing position by blocking a selected control pin, a withdrawing plate effective in response to a form out signal after engagement between said selected control pin and said selectively positioned form out stop for withdrawing said selected control pin to unselected position, and a selecting lever effective in response to a form out signal after engagement between said selected control pin and said selectively positioned form out stop for setting a control pin corresponding to the first line of a new form to thereby control the feeding of said new form.

8. In a feed control mechanism for power operated printing machines, a rotatable platen for advancing message forms therearound, means for rotating said platen, a stop mechanism having slots corresponding to successive line positions of said platen up to a predetermined maximum number thereof, a form out stop positionable in one of said slots corresponding to the length of said message forms, a control mechanism rotatable with said platen and having a plurality of selectable control pins, means responsive to a form out signal for enabling rotation of said platen by said rotating means, a selected control pin being effective to engage said form out stop upon rotation of said platen to thereby stop said platen with the first line of a new message form in printing position, and other means responsive to said form out signal and effective upon the stopping of said platen for withdrawing said selected control pin from selection and selecting the control pin corresponding to said first line of said new message form.

9. In a feed control mechanism for power operated printing machines, a rotatable platen for advancing message forms therearound, means for rotating said platen, a stop mechanism having slots corresponding to successive line positions of said platen up to a predetermined maximum number thereof, an indicator adjacent said stop mechanism for indicating the line position of said platen, a form out stop positionable in one of said slots corresponding to the length of said message forms as determined by said indicator, a control mechanism rotatable with said platen and having a plurality of selectable control pins, means responsive to a form out signal for enabling rotation of said platen by said rotating means, a selected control pin being effective to engage said form out stop upon rotation of said platen to thereby stop said platen with the first line of a new message form in printing position, and other means responsive to said form out signal and effective upon the stopping of said platen for withdrawing said selected control pin from selection and selecting the control pin corresponding to said first line of said new message form.

10. In a feed control mechanism for power

operated printing machines, a rotatable platen for advancing message forms therearound, means for rotating said platen, a stop mechanism having slots corresponding to successive line positions of said platen up to a predetermined maximum number thereof, a form out stop positionable in one of said slots corresponding to the length of said message forms, a plurality of selectable vertical tabulation stops in the remainder of said slots, selected ones of said vertical tabulation stops being set in positions corresponding to print receiving lines of said message form, a control mechanism rotatable with said platen and having a plurality of selectable control pins, means responsive to either a form out signal or a vertical tabulation signal for enabling rotation of said platen by said rotating means, a selected control pin being effective to engage the next selected vertical tabulation stop to stop rotation of said platen upon rotation thereof in response to a vertical tabulation signal, means effective in response to a form out signal to enable said selected control pin to pass all selected vertical tabulation stops and engage said form out stop to thereby stop rotation of said platen with a new message form in printing position, and other means responsive to said form out signal and effective upon the stopping of said platen for withdrawing said selected control pin from selection and selecting the control pin corresponding to the first line of said new message form.

11. In a feed control mechanism for power operated printing machines, a rotatable platen for advancing message forms therearound, means for rotating said platen, a stop mechanism carrying a form out stop positionable in accordance with the length of said message forms, a control mechanism rotatable with said platen and having a plurality of selectable control pins, manually operable means for initially selecting one of said control pins corresponding to a zero position or first printing line position on a first message form, means responsive to a form out signal for enabling rotation of said platen by said rotating means, the selected control pin being effective to engage said form out stop upon rotation of said platen to thereby stop said platen with the next message form in zero position, and automatic means responsive to said form out signal and effective upon the stopping of said platen for withdrawing the previously selected control pin and selecting a new control pin corresponding to said zero position on said next message form.

12. In a feed control mechanism for power operated printing machines, a rotatable platen for advancing message forms therearound, means for rotating said platen, means responsive to line feed signals for enabling normal line to line advancement of said platen by said rotating means, a stop mechanism carrying a form out stop positionable in accordance with the length of said message forms, a control mechanism rotatable with said platen and having a plurality of selectable control pins, a plurality of variably positionable contact means engageable and operable by a selected control pin, said contact means being positioned respectively in accordance with selected printing line positions on said message forms, said selected control pin being effective to engage and operate said contact means upon said platen being rotated to positions corresponding to said selected printing line positions, means responsive to a form out signal for enabling free

rotation of said platen by said rotating means

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said selected control pin being effective to engage said form out stop upon rotation of said platen in response to said form out signal to thereby stop said platen with the next message form in printing position, and means responsive to said form out signal and effective upon the stopping of said platen for withdrawing the previously selected control pin and selecting a new control pin corresponding to the printing position on said next message form.

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