

Oct. 26, 1954

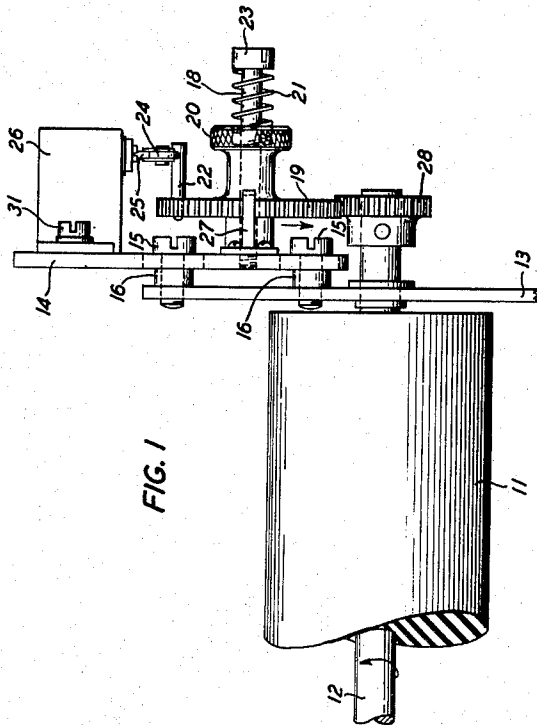
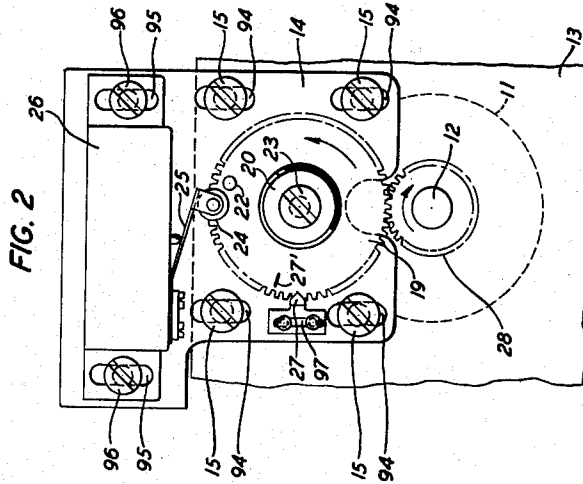
W. Y. LANG

2,692,911

PRINTING TELEGRAPH APPARATUS

Filed Sept. 13, 1950

2 Sheets-Sheet 1



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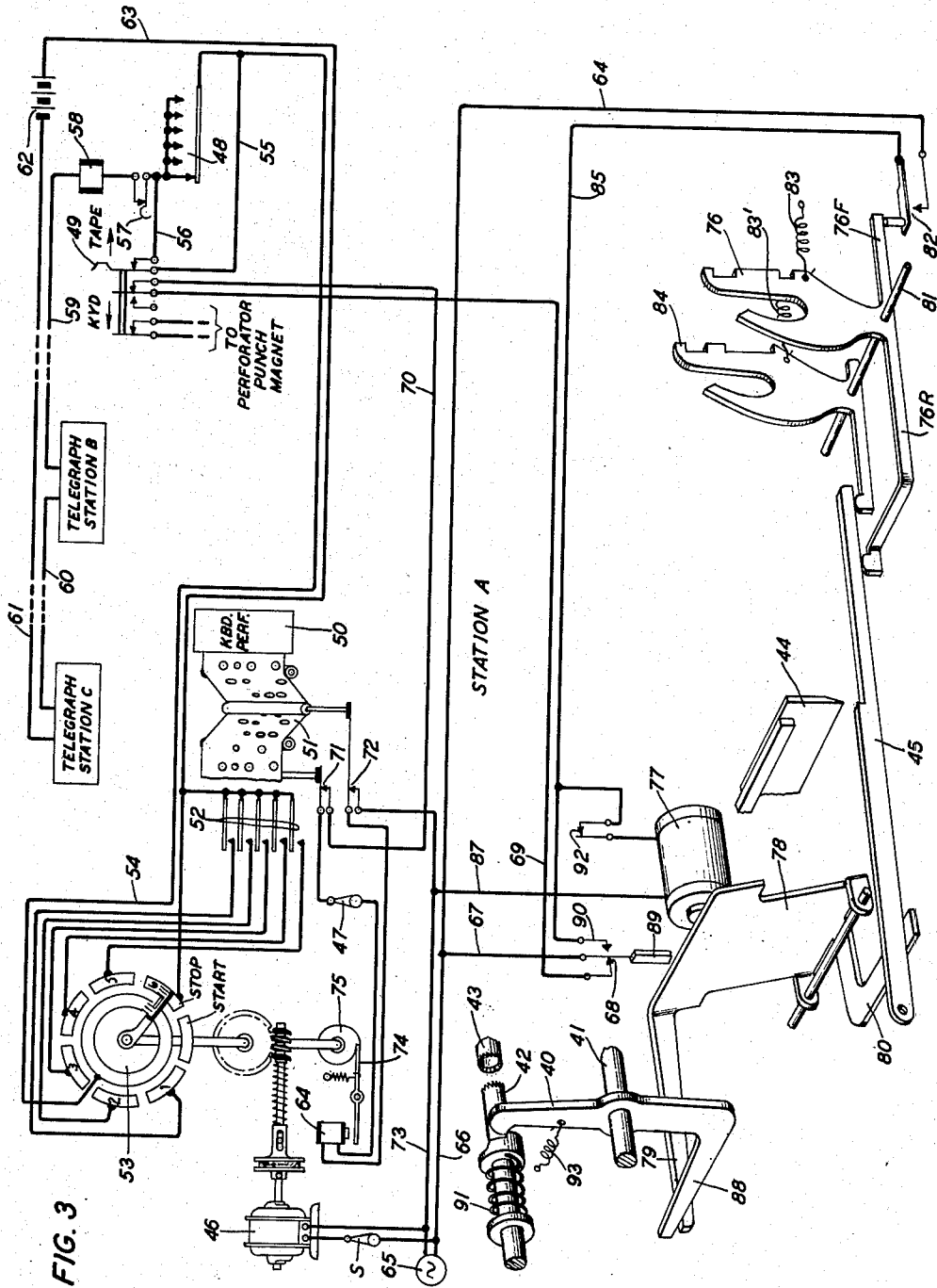
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PRINTING TELEGRAPH APPARATUS

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This invention relates to teletypewriter machines and more particularly to those machines employing sprocket-feed form-stationery such as single or fanfold sheet stationery, coupon stationery, manifold stationery and the like.

An object of the invention is to automatically rotate, step by step, the platen of a teletypewriter in a continuous manner through any desired number of steps in response to a single operation of a special teletypewriter key whereby a sheet of stationery of a continuous stack is brought into a desired recording position on the typewriter platen.

Heretofore when operating a printing teletypewriter of the page, or bulletin type, it was necessary when starting to record signal characters on the next sheet of a roll of stationery or continuous stack of form-stationery to operate the line-feed key a number of times corresponding to the number of line spaces through which the platen must be stepped so that the next sheet or form is moved into the desired position for recording the information transmitted locally or from a remote station, on the first or any other desired printing line of the form.

According to the present invention there is added to one end of the platen shaft of a page, or bulletin, type teletypewriter, a system of gears which is arranged to operate with a mechanism also added to the teletypewriter and serving to further control the line-feed functions whereby a vertical tabulator mechanism is provided for automatically rotating, step by step, the platen and its shaft in a continuous manner a variable number of steps or revolutions in response to the single operation of a teletypewriter key especially assigned for that purpose. Form-stationery or a sheet of stationery is positioned on a teletypewriter platen in the usual manner, that is, it is positioned so that the matter to be recorded in response to signals received by the printing unit of the teletypewriter will begin on the first or any other desired line on the copy. A pinion is fixedly mounted on one end of the platen shaft and is arranged to normally mesh with a gear that is rotatably mounted on a shaft fixed to the side of the teletypewriter framework. The gear is arranged to be manually rotated on its shaft, independently of the pinion, any variable angular distance with respect to the position of the platen at the time the stationery is manually positioned in the teletypewriter. By the manual rotation of the gear an index line on the gear is brought into alignment with a fixed indicator pointer located outside of, but in

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proximity to, the periphery of the gear. A camming pin, fixedly mounted near the periphery and on the outside face of the gear, is provided for predetermining the angular distance through which the gear is to be continuously rotated after the printed matter has been recorded on the copy and the operator wishes to advance the copy through a plurality of line spaces before recording additional printed matter or wishes to advance to the first line of the next form or sheet. The printed matter is recorded in response to the signals received by the printing unit and each time the platen rotates in response to a line-feed signal the gear with the camming pin rotates an increment corresponding to each line space and finally reaches a position where a multiplicity of line-feed signals resulting in continuous rotation are required to again bring the index line into alignment with the indicator pointer. The continuous rotation, however, does not start until the special teletypewriter key is momentarily operated to close a circuit for causing the continuous rotation of the gear to thereby complete its revolution. The ratio of the gear and pinion may be such as to permit a partial revolution of the platen or a plurality of revolutions of the platen for one revolution of the gear.

A feature of the invention is the provision of a vertical tabulator mechanism on a sprocket-feed page teletypewriter for operating in a simple manner a form-stationery starting gear system which operates in response to the single operation of a key of the teletypewriter keyboard to automatically rotate the teletypewriter platen whereby the stationery is moved in a continuous manner a predetermined number of line spaces independently of the teletypewriter line-feed function lever.

Another feature is to permit successive forms of stationery stacked in continuous sheet forms to be advanced to a recording position on the teletypewriter platen through a variable number of line spaces.

Another feature is to electrically control the automatic rotation, step by step in a continuous manner and in response to a momentary operation of a key of a teletypewriter keyboard, of the teletypewriter platen through a variable angular distance less than or in excess of 360 degrees.

Another feature is the provision of means of changing, as desired, the ratio of the gear to the pinion on the platen shaft in a simple manner.

Other objects and features will be obvious from the following description and drawings of which:

Fig. 1 shows a front elevational view of a form-stationery starting gear system affixed to the right-hand end of the platen assembly of a page-printing teletypewriter;

Fig. 2 shows a right-hand end elevational view of Fig. 1; and

Fig. 3 shows the schematic circuit of an intercommunicating system having stations A, B and C. Station A is shown somewhat in detail whereas stations B and C are represented by individual blocks. The local circuit shown for station A operates to cause the teletypewriter platen to be automatically rotated, in a continuous manner, through any part of a revolution or one or more complete revolutions as desired, in response to the momentary operation of a key of the teletypewriter keyboard.

In the drawings like parts have the same reference characters.

Referring to Figs. 1 and 2, platen 11 is fixedly mounted on shaft 12 of a page teletypewriter of the type disclosed in United States Patent 1,904,164, granted to S. Morton et al. on April 18, 1933, but equipped with a suitable form of sprocket-feed for feeding to the platen stationery having perforations therein as shown in United States Patent 1,983,586, granted to E. F. Watson et al. on December 11, 1934. The page teletypewriter is shown connected to an automatic tape transmitter of the type disclosed in United States Patent 2,262,014, granted to W. Y. Lang on November 11, 1941. These disclosures are hereby made a part of this specification as if fully set forth herein.

On the right-hand upright of the teletypewriter framework 13 is supporting bracket 14, the bracket being supported by means of machine screws 15 inserted in spacers 16 and fastened in tapped holes provided in framework 13. Fixedly mounted in a tapped hole in bracket 14 is axle 18, on which gear 19 is rotatably mounted. A knurled-edged knob 20 is integrally formed on the outside face of, and positioned concentrically with, rotatable gear 19. Coil spring 21 is mounted on axle 18. It is retained between head 23, of axle 18, which is a slotted head for making the axle secure in the tapped hole in bracket 14, and an annular recess which is centrally located in the head of knob 20. On the outside face of gear 19, at a point near the periphery, is fixedly mounted camming pin 22. Pin 22 is provided to engage roller 24 rotatably mounted on a switch lever 25 of microswitch 26. Microswitch 26 is of the type disclosed in United States Patent 1,960,020, granted to P. K. McGall on May 22, 1934. The McGall patent is likewise made part of this specification as if fully set forth herein.

Gear 19 has a normal position wherein its index line 27 is directly in alignment with an index pointer 27 mounted on bracket 14 as shown in Fig. 2. Also, when gear 19 is in its normal, or index, position, camming pin 22 is in engagement with roller 24 on contact lever 25 so that a set of contacts controlled by contact lever 25 is normally open. The teeth on gear 19 are normally in mesh with the teeth of pinion 28 fixedly mounted on the right-hand end of platen shaft 12, but by manually pulling knob 20 outwardly against the compression of coil spring 21 the teeth on gear 19 may be disengaged from the teeth of pinion 28. When the gear is in this outward position, it may be

rotated a predetermined angular distance to its index position in a clockwise or a counter-clockwise direction and there permitted under the influence of the compression now existing in coil spring 21, to return inwardly so that the teeth again mesh with the teeth of pinion 28 but at the rotated, or operated, position of the gear. The gear and pinion will remain in this rotated relationship for the duration of the recordation of the necessary information on the stationary, preferably of the form type. They will remain in this rotated relationship once they have been set for the initial form of a set of forms without further repositioning of knob 20. When the information is recorded on the form-stationery and it is desired to advance the platen so that a predetermined line on the next sheet or form-stationery may be brought into its recording position, a teletypewriter key, such as the key for the letter Z referred to herein as the form feed-out key, is operated following upper case or shift, to cause platen shaft 12 to be automatically rotated, step by step, in a continuous manner through the desired number of line spaces or through one or more revolutions depending on the ratio of the diameter of gear 19 to that of pinion 28. The form feed-out key is so called because it, when operated, feeds form-stationery out of the teletypewriter. It may also be identified as the vertical tabulator key.

Referring now to Fig. 3, clutch throw-out lever 49 is mounted on a pivoted shaft 41 and is arranged to be moved into and out of engagement with driven member 42 of a grab clutch whereby driven member 42 may be moved out of or into engagement with driving member 43 of the clutch. Clutch member 43 is fixed to the main shaft of the teletypewriter and is driven by a motor, not shown. The motor is shown in Fig. 11 of Morton et al. Patent 1,904,164, supra. When clutch-driven member 42, under the influence of coil spring 91, engages driving member 43 the cam sleeve assemblies which actuate the main bail and function bail assemblies are permitted to rotate thus providing movement back and forth, of function bail blade 44. As the function bail blade 44 is moved back and forth at a time when line-feed push-bar 45 is in its operated, or upward, position as a result of the line-feed key being depressed, the push-bar is engaged by the function bail blade and the latter upon its movement in a backward direction moves the push-bar, also in a backward direction, to operate a linkage mechanism, not shown. The linkage mechanism is connected to the left-hand end of the push-bar and when pushed upward and then pulled downward in response to the backward and forward movement of the push-bar, causes a pawl to move into engagement with a ratchet affixed to platen 11 at the end opposite to that where pinion 18 is located, whereby the platen is rotated one step, or line space, for each oscillation of the function bail blade. One oscillation of the function bail blade corresponds to a single rotation of clutch members 42 and 43. The linkage mechanism for operating the line-feed pawl and ratchet is shown in Figs. 4 and 7 of Morton et al. Patent 1,904,164, supra. The platen when stepped by the linkage mechanism is moved in a clockwise direction and gear 19 which is in mesh with pinion 28 is moved in a counter-clockwise direction. These directions are indicated by arrows shown in Fig. 2.

Should throw-out lever 40 be maintained out of engagement with driven clutch member 42 to permit continuous rotation of clutch members 42 and 43 and the main shaft cam assembly (not shown), as will be hereinafter described, platen 11 likewise will rotate continuously through a number of steps or revolutions, as desired, under the influence of the line-feed linkage mechanism to return gear 19 to its index position. When gear 19 returns to its index position the set of contacts in microswitch 26 is opened by camming pin 22 engaging roller 24 on lever 25 and a circuit including this set of contacts is thereby opened to permit throw-out lever 40 to again become engaged with clutch-driven member 42 to stop the rotation of the main shaft cam sleeve assembly which is connected to the left-hand end of driven member 42. The cam sleeve assembly upon being stopped, stops through the line-feed linkage mechanism, the rotation of platen 11. In this manner platen 11 is rotated by virtue of the main shaft rotating, clutch members 42 and 43 being in inter-engagement and of the mechanism energized for holding line-feed push-bar 45 in an upward position and in engageable relation with function bail blade 44 until the desired number of line-feed steps in continuous rotation of the platen is effected. Thus the stationery on the platen may be advanced to the desired line for recording a message in response to a momentary operation of a key provided especially for this purpose.

The automatic tape transmitter is driven by motor 46 which starts operating when its manually operable start switch S is closed as shown. The tape perforator-transmitter may be used for either direct keyboard transmission from the teletypewriter sending contacts 48 or automatic tape transmission depending on the position to which transmitting key 49 is operated. Key 49 in its right-hand, or normal, position connects the automatic tape transmitter to the line circuit, the teletypewriter keyboard transmitter represented by sending contacts 48 being shunted at the outermost right-hand normally closed contacts of key 49. Key 49 in its left-hand, or operated, position removes the shunt around keyboard sending contacts 48 and thereby permits keyboard sending to the line circuit.

The automatic tape transmitter is supplied with tape by keyboard perforator 50 which perforates the tape 51 in accordance with signals transmitted from the keyboard of tape perforator 50. The energizing circuit for the punch magnet, not shown, of perforator 50 is prepared at the outermost left-hand contacts of key 49. The automatic tape transmitter comprises tape sensing contacts 52 for translating the signal combinations perforated in tape 51 into coded signal current combinations for transmission to the line circuit which at this time may be traced over the five selecting segments of start-stop rotary distributor 53, conductors 54 and 55, outermost right-hand normally closed contacts of key 49, conductor 56, normally closed "break" signal key 57, through the winding of the teletypewriter printer selector magnet 58, conductor 59, through station B, conductor 60, through station C, conductor 61, battery 62, conductor 63, tape sensing contacts 52, and back to the segments of distributor 53. For tape transmission manually operated tape switch 47 must be closed as shown. Stop magnet 64 is operated in a circuit traceable from

alternating-current source 65, conductors 66 and 67, normally closed contacts 68, conductor 69, middle normally closed contacts of key 49, conductor 70, sixth pin contact 71 which is closed whenever tape is in the tape transmitter, switch 47, through the winding of magnet 64, tape stop contact 72 which is closed when sufficient perforated tape is prepared for transmission by keyboard tape perforator 50, conductor 73, back to the alternating-current source 65. Stop magnet 64, upon operating, permits rotation of the brushes of distributor 53 to transmit the signals translated from the corresponding combinations of perforations in tape 51. For a more detailed description of the transmitter-distributor showing the means of stepping the perforated tape in synchronism with the rotation of the distributor brushes, reference may be had to the Lang patent, supra.

Keyboard transmitter comprising sending contacts 48 is arranged to transmit over a path extending through the rotary distributor 53 in its stationary position and is effectively connected to the line circuit when key 49 is operated to its left-hand position, the path being traceable from battery 62, conductor 63, stop segment, brushes and the continuous conducting ring of distributor 53, conductor 54, keyboard sending contacts 48, "break" signal key 57, through the winding of printer selector magnet 58, conductor 59, through station B, conductor 60, through station C, conductor 61 and back to battery 62. Stop magnet 64 is de-energized when key 49 is operated to its keyboard, or left-hand, position, inasmuch as its operating circuit is opened at the middle normally closed contacts of key 49, and the extension arm 74 of its armature is moved into engagement with cam 75. Cam 75 when so engaged maintains the distributor brushes in a stationary condition for the duration of keyboard transmission.

The essential changes made in the page-type teletypewriter to achieve the object of the present invention, involve the addition of a special vertical tabulator function lever 76 responsive to a signal code combination, for example, upper case letter Z, an alternating-current magnet 77 with armature 78 equipped with extensions 79 and 80 and a gearing arrangement to operate switch contacts 92 of microswitch 26, contacts 92 being under the control of lever 25. Function lever 76 is preferably identified herein as a special vertical tabulator, or form-out, function lever because in response to a single operation thereof platen 11 may be automatically rotated in a continuous manner through a considerably large variable number of successive steps and any stationery in position on the platen at the time is moved in a vertical direction through a corresponding number of line spaces. This automatic method of stepping the platen in a continuous manner can be accomplished more conveniently than by a corresponding number of line-feed key operations as heretofore required. Function lever 76 has a front extension bar 76F and rear extension bar 76R, the rear extension bar 76R extending under the line-feed push-bar 45. The front extension bar 76F in response to the forward movement of function lever 76 in a clockwise direction around pivot rod 81 effects the momentary closure of contact 82. The rear extension bar 76R in response to the forward movement of function lever 76 moves the right-hand end of line-

feed push-bar 45 upward into a position where a shoulder in the top surface of push-bar 45 may be engaged by the function bail blade 44. The function bail blade 44 is adapted to span all the function lever push-bars and to cooperate therewith as described under the caption "Auxiliary Selector and Function" on page 8 in Morton et al. 1,904,164, supra.

In response to the signal code combination corresponding to upper case letter Z the impulse vanes, shown in Figs. 8, 9 and 10 of Morton et al. Patent 1,904,164, supra, are positioned accordingly and are locked in their respective positions by the forward movement of a locking function lever referred to in Morton et al. Patent 1,904,164 as vane locking lever 191 which operates simultaneously with any one of the function levers, function lever 76 being operated at this time under the influence of coil spring 83 individual thereto. The vanes are locked only until the desired function of the signal is completed. The operations that automatically follow will be briefly described herein with reference to Morton et al. Patent 1,904,164, supra, and the reference characters used therein. Referring to Figs. 6, 7 and 11 and line 26, page 9 of Morton et al. Patent 1,904,164, supra, function cam 190 on shaft 76 acts upon follower roller 187 and tends to rotate function bail 161 in a clockwise direction about bail shaft 125, causing function bail blade 188 to engage the selected function lever push-bar (in the present application function bail blade 44 engages line-feed push-bar 45) and urge the selected push-bar to the left to perform its described function. Upon completion of this movement function bail 161 is released by function cam 190 and is returned to its normal position by means of spring 189, one end of which is secured to function bail 161 and the other end to vane framework 7. According to the description beginning in line 62, page 11, of the Morton et al. Patent 1,904,164, it is stated that when the function lever selected is the line-feed lever the associated push-bar 238 is pushed to the rear, or left, by function bail 161 which causes lever 242 to rotate in a clockwise direction and, in turn, causes lever 251 to rotate in a counter-clockwise direction through link rod 246, and the rotation of lever 251 causes pawl 254 to be moved toward the left, as viewed in Fig. 7, to engage a tooth on ratchet 255 and rotate the platen one step.

However, in the arrangement disclosed herein, when vertical tabulator function lever 76 is operated, it performs the same function as that of the function lever 84 which is the line-feed function lever, except that the function bail blade 44 does not immediately release line-feed push-bar 45 because of the operation of alternating-current magnet 77 in response to the operation of the function lever 76. The operation of function lever 76 in a clockwise direction upon effecting the momentary closure of contact 82, completes a circuit traceable from one side of alternating-current source 65, conductors 66 and 64, contact 82, conductor 65, contact 92 of microswitch 26, through the winding of alternating-current magnet 77, conductors 87 and 73, to the other side of source 65. Magnet 77 operates to attract its armature 78. It is preferable that the alternating-current magnet 77 be located immediately to the rear and in close proximity to the main clutch throw-out lever 40 so that an extension arm 79 affixed to one end of armature 78 may engage arm 88 of the main clutch throw-out lever 40 when armature 78 is attracted to the ener-

gized alternating-current magnet 77. To the lower side of armature 78 is an extension arm 80 which is positioned with respect to line-feed push-bar 45 to hold the push-bar in its operated position when alternating-current magnet 77 is energized. Thus, when magnet 77 is energized the line-feed push-bar is held in engageable relation with function bail blade 44 and the clutch throw-out lever 40 is held away from the camming surface of driven clutch member 42 by virtue of extension 79 on armature 78 intercepting extension arm 88 of lever 40. Under these conditions rotation of the cam sleeve assembly controlling the movement of function bail blade 44 is accomplished and on such movement of the function bail blade 44 line-feed push-bar 45 is moved toward the left then toward the right, thus stepping the platen one step for each cycle of movement.

Magnet 77, upon attracting its armature 78, causes swinger 89 to become disengaged from contact 68 and engaged with contact 90 to close an obvious locking circuit for the magnet which remains operated for a duration of time as will be hereinafter described. Swinger 89, upon being disengaged from contact 68, opens the circuit of magnet 64, if the tape transmitter has been in operation, to suspend signal transmission to the printer while magnet 77 remains operated and causes continuous operation of the line-feed mechanism, which magnet 77 does by retaining function lever line-feed push-bar 45 in its operated position, thereby rendering line-feed function lever 84 ineffective, and causing the platen to be rotated in a clockwise direction under the influence of the main bail cam on the continuously rotating main shaft. Consequently, gear 19 rotates continuously in a counter-clockwise direction until camming pin 22 on gear 19 engages roller 24 on switch lever 25. Camming pin 22 upon engaging roller 24, causes contact 92 of microswitch 26 to open to thereby deenergize magnet 77. Magnet 77 upon becoming deenergized, releases its armature 78 which in turn permits clutch throw-out lever 40 to return to its normal position under the influence of coil spring 93 whereby driven member 42 and driving member 43 become disengaged to stop rotation of the cams controlling the movement of function bail blade 44 thus stopping the rotation of gear 19 at its normal index position which corresponds to the recording position of platen 11 whereat it is desired to resume recording. Upon the release of armature 78, swinger 89 again engages contact 68, and if switch 47, contacts 71, contacts 72, and middle normally closed contacts of key 49 are all closed, magnet 64 will be energized to cause resumption of transmission from the tape transmitter.

The system of gears of the present invention provides means for permitting the ratio between gears to be changed as desired. For example, a gear of larger or smaller diameter than that of pinion 28 and a gear of smaller or larger diameter than that of gear 19 may be used in accordance with the ratio desired. For this reason slots 94 are provided in bracket 14 to fit the shanks of screws 15 to allow for the desired amount of upward or downward movement of the bracket. Likewise, slots 95 in the base of microswitch 26 are provided to fit the shanks of screws 96 and a single slot 97 is provided in index pointer 27, whereby the microswitch and index pointer may be correspondingly adjusted with bracket 14 when a change in gear ratio is made. If de-

sired, variation in ratio may be obtained by incorporation of any of the well-known gearing systems such as the use of an idler cluster gear interposed between gear 19 and pinion 28.

What is claimed is:

1. A telegraph printing machine for printing on stationery comprising a recording paper, a platen for advancing the paper in said machine in a stepping manner, an operating mechanism for controlling the stepping operation of said platen, mechanical operating means for operating said mechanism to step said platen a predetermined distance for each operation of said mechanism, and other mechanically operating means for operating said mechanism to advance said platen in a rapid repetition of discrete steps each comprising said predetermined distance in the same direction a variable distance to thereby advance the paper to a predetermined line on said paper for recording purposes.

2. A telegraph printing machine for printing on stationery comprising a recording paper, a platen for advancing the paper in said machine in a stepping manner, a line feed operating mechanism for controlling the stepping operation of said platen, mechanically operated means for operating said mechanism to step said platen a predetermined distance for each operation of said mechanism, and other mechanically operating means for operating said mechanism to advance said platen in a rapid repetition of discrete steps each comprising said predetermined distance in the same direction a variable distance to thereby advance the paper to a predetermined line on said paper for recording purposes.

3. A telegraph printing machine for printing on stationery comprising a recording paper, a platen for advancing the paper in said machine in a stepping manner, a step-by-step operating mechanism for controlling the rotational step-by-step movement of said platen, mechanically operated means for operating said mechanism to step said

platen a predetermined distance for each operation of said mechanism, and other mechanically operating means for operating said mechanism to advance said platen step by step in the same direction a variable distance to thereby advance said paper to a predetermined line on said paper for recording purposes.

4. In a telegraph printing machine for printing on stationery comprising a recording paper, a stepping member engaging said paper, means activated in response to a predetermined received signal for controlling the stepping operation of said member a predetermined distance, means activated in response to a different predetermined signal for initiating the stepping operation of said member through a plurality of discrete steps each step equal to said predetermined distance and means controlled by said stepping member for determining the number of said steps.

5. In combination with a telegraph printing machine having a platen equipped with a ratchet engageable by a pawl driven by a cyclically operable clutch through the intermediate agency of a selectable member, an attachment for said machine including means for selecting said member and for imparting continuous operation to said clutch to cause said pawl to engage said ratchet repetitiously and advance said platen in rapidly recurring discrete steps, and said attachment also including means operable by the motion imparted to said platen for suspending operation of said clutch upon arrival of said platen in a predetermined rotative position.

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