

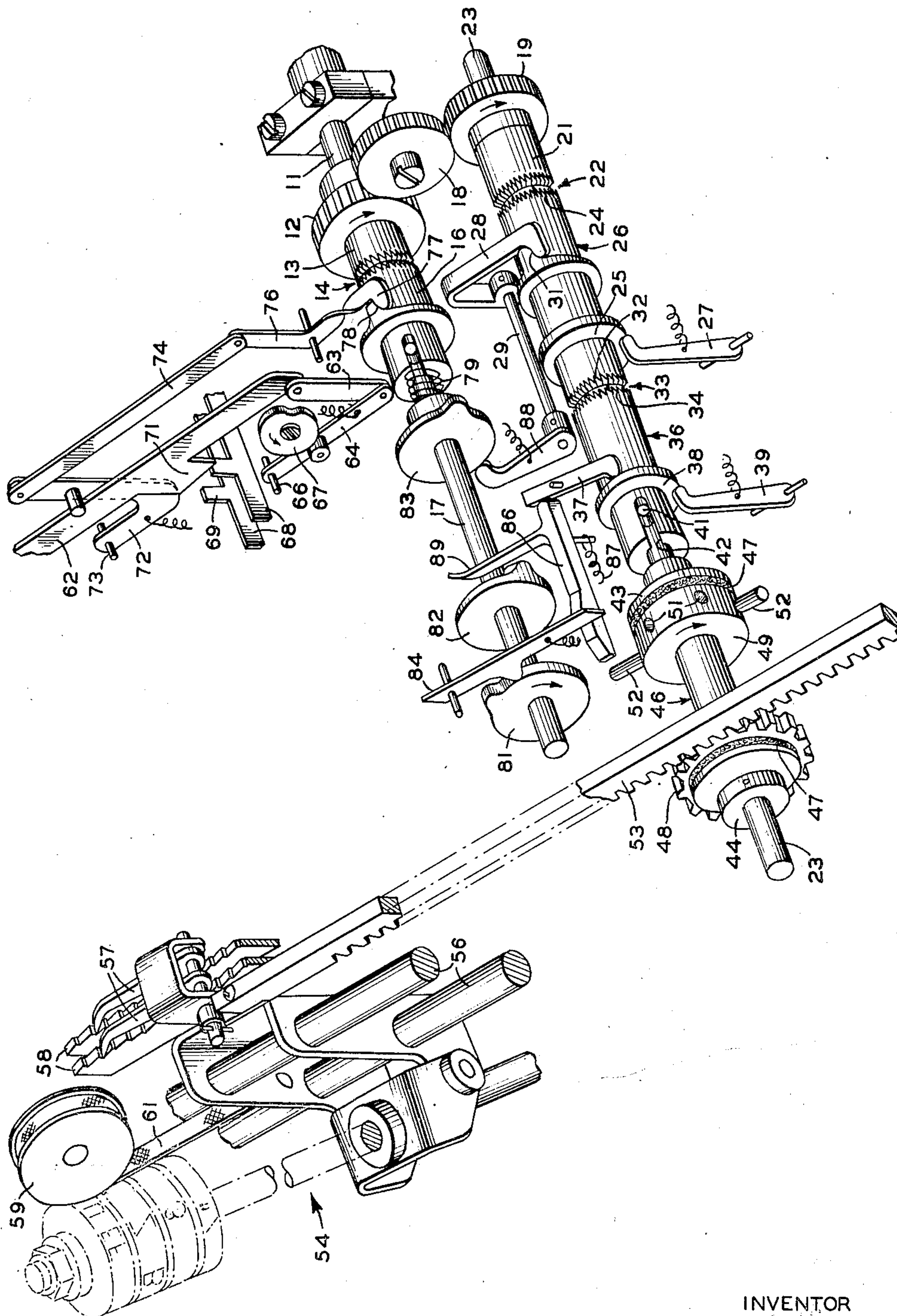
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PRINTING TELEGRAPH APPARATUS

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PRINTING TELEGRAPH APPARATUS

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The present invention relates primarily to printing telegraph apparatus and more particularly to tabulating mechanisms for association with telegraph printers to facilitate recording in columns on a recording blank or web.

It is an object of the present invention to provide a tabulating mechanism for telegraph printers that is more reliable and efficient in operation than those proposed heretofore.

Another object of the invention is to provide a tabulating mechanism wherein the relative movement of the printing unit with respect to the recording blank from the end of one column of printed matter to the beginning of the next column is effected in a continuous movement.

Still another object of the invention is to provide a tabulating mechanism for telegraph printers wherein the movement of the recording unit relative to the recording blank from the end of one column to the beginning of the next is effected in conjunction with a single cycle of operation of the printer and in a period of time not greater than that required to record a single character by the printing mechanism.

Still another object of the invention is to provide a tabulating mechanism which includes an auxiliary recording unit advancing means which is rendered operative in response to a tabulating signal to advance the recording unit from the last printed character in one column to the beginning of the next.

Still another object of the invention is to provide a tabulating mechanism embracing the above enumerated and other features which does not interfere with the usual functions of the printer with which it may be associated.

The above and further objects of the invention will appear hereinafter and be more fully understood from the following detailed description of a preferred embodiment thereof wherein reference is made to the accompanying drawing.

The drawing is a perspective view of the tabulating mechanism of the present invention together with certain cooperating elements and mechanisms of a telegraph printer.

The elements and mechanisms of the telegraph printer to which the present invention is applied is disclosed in U. S. Patent No. 2,281,775 to J. W. Long et al., granted May 5, 1942, and the said patent is made a part of the present application as if fully included herein. While the tabulating mechanism of the present invention is shown applied to this particular telegraph printer, it will be apparent that the mechanism is not limited in application to this particular printer

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but may be readily applied to various other telegraph printers.

In the drawing the constantly rotating selector shaft 11, corresponding to the selector shaft 89, Fig. 8, of the Long et al. patent, is extended and has fixed thereto for rotation therewith a gear 12. Rotatable with the gear 12 is the driving element 13 of a ratchet type clutch indicated generally by reference numeral 14 which also includes a driven element 16. Through the clutch 14, in the manner hereinafter described, the shaft 17 in axial alignment with the selector shaft 11 is adapted to rotate one revolution at a time.

The constantly rotating gear 12 which is fixed to the extension of the selector shaft 11, meshes with an idler gear 18 which also meshes with a gear 19. The gear 19, together with the driving element 21 of a ratchet type clutch indicated generally by reference numeral 22, is freely mounted on a shaft 23 extending parallel to the shaft 17. The driven element 24 of the clutch 22 is formed integrally with a sleeve 26 freely mounted on the shaft 23. The sleeve 26 is urged toward the right to effect engagement of the driving and driven elements of the clutch 22 by the action of a spring-actuated lever 27 working against a flange 25 on the sleeve 26. However, a trip latch 28 mounted on a rock shaft 29 normally has the free end thereof engaging a shoulder or cam surface 31 on the sleeve 26 to prevent rightward movement thereof.

The left hand end 32 of the sleeve 26 forms the driving element of another ratchet type clutch 33 having a driven element 34 formed integrally with another sleeve 35 of the shaft 23. Normally the driving and driven elements of clutch 33 are also disengaged, being held apart by a lever 37, the forward end of which engages a flange 38 on the sleeve 36. These elements of the clutch 33, however, are urged toward engagement by a spring operated lever 39 working against the flange 38 on the sleeve 36.

The sleeve 36, while being free on the shaft 23 and adapted for longitudinal movement along the shaft, is adapted to rotate therewith by means of a pin 41 extending axially from the shaft and engaging axial slots such as 42 in the left hand end of the sleeve 36. To the left of the sleeve 36 and suitably fixed to the shaft 23 for rotation therewith are collars 43 and 44 which have located therebetween a sleeve 46. The sleeve 46 is frictionally coupled to the shaft for rotation therewith by friction discs 47 engaging the ends of the sleeve 46 and co-operating faces

of the collars 43 and 33. The axial pressure on the friction discs 47, which are of suitable material such as felt, may be maintained by any one of a number of well known arrangements.

The sleeve 46 has fixed thereto adjacent one end thereof a gear 48, and adjacent the other end a collar 49 with axial holes such as 51 predeterminedly spaced around the periphery thereof. Into one or more of the holes such as 51 are placed radially extending pins such as 52 and the number of these pins and the placing thereof in the collar 49 determine the number of columns that may be printed on the recording blank and the distances from the edges of the blank at which these columns begin.

The gear 48 has in engagement therewith a rack 53, the rear end of which is suitably attached to the typewheel car of the printer indicated generally by reference numeral 54. The typewheel car 54 is guided for to-and-fro movement along guide rods 56 in a direction parallel to the rack 53 and perpendicular to the shaft 23. The guide rods 56 correspond to rods 456 and 457, Fig. 40, of the above-mentioned Long et al. patent.

The typewheel car 54 includes a pair of pawls 57 cooperating with a pair of racks 58 and the normal advancement of the typewheel car in a letter spacing direction is effected by movement of one of the racks 58. This movement of the typewheel car in a letter spacing direction effects tensioning of a spring in a drum 59 having a web 61 attached to the typewheel car, and at the end of one line of print, disengagement of the pawls 57 from the racks 58 permits the spring drum 59 to effect backward movement of the car, or a typewheel car return function as it is sometimes called, preparatory to the beginning of a new line of print.

In the course of printing a full line wherein no tabulation is effected, the forward and backward movement of the typewheel car 54 through the rack 53 effects rotation of the sleeve 46 step-by-step in one direction during the step-by-step movement of the typewheel car in a letter spacing direction and continuously in the other direction during the continuous typewheel car return operation. Through the friction elements 47 this rotation of the sleeve 46 and attached gear 48 effects corresponding rotation of the shaft 23 and sleeve 36.

As described in the above-mentioned Long et al. patent, functions of the disclosed printer are effected through the selective operation of a number of so-called floating levers. During each cycle of operation of the printer one end of all the floating levers move in a downward direction and unless an associated function is to be performed the levers pivot idly about their other ends. When one or more printer functions are to be performed during a cycle of operation of the printer, the selective positioning of a plurality of slide bars adjacent the center of the floating levers places one or more interponents in the path of movement of the floating levers. Accordingly, subsequent downward movement of one end of the floating levers causes those having interponents at their centers to pivot thereat whereby the other ends of the selected floating levers move upward and links attached thereto are actuated to perform associated functions.

It is such a floating lever 62 which is employed to initiate into operation the tabulating mechanism. The floating lever 62 is cyclically operated through a link 63 and a lever 64 pivoted at 66

by a cam 67 which makes one revolution during each cycle of the printer. During cycles of operation, other than tabulating cycles, the floating lever 62 pivots idly about its opposite end.

In response to a received tabulating signal code combination, one or more slide bars such as 68 are selectively moved to place upwardly extending projections such as 69 beneath a downwardly extending projection 71 adjacent the center of the floating lever 62. Accordingly, during the following downward movement of the forward end of the floating lever 62, the said projections 69 and 71 engage whereupon the floating lever pivots at its center. Such pivoting of the floating lever 62 effects rocking of a bell crank 72 about its pivot 73 in a counterclockwise direction which motion is transmitted through a link 74 to a trip arm 76 associated with the clutch 14. This movement of the trip arm 76 causes the end 77 thereof to disengage itself from the cam surface 78 of the driven element 16 of the clutch 14 whereupon a spring 79 is effective to slide the driven element 16 along the shaft 17 into engagement with the driving element 13. Thereupon, the shaft 17 will rotate with the shaft 11 and since the trip arm 76 is momentarily operated the end 77 thereof will return to its normal position in the path of the cam surface 78 to effect disengagement of the driving and driven elements of the clutch 14 following a revolution thereof.

Fixed to the shaft 17 for rotation therewith are three cams 81, 82 and 83. The cam 81 during the first part of the revolution of the shaft 17 operates a lever 84 to release a slide bar 86 and permit the same under the influence of its attached spring 87 to move longitudinally to the left. This leftward movement of the slide bar 86 places the left hand end thereof in the path of rotation of the pins 52 and through the lever 37 engaging the right hand end of the slide bar and the flange 38, permits the sleeve 36 to slide along the shaft 23 to effect engagement of the driving and driven elements 32 and 34, respectively, of clutch 33.

Some time thereafter the cam 83 through an arm 88 effects rocking of shaft 29 to withdraw the end 31 of the trip lever 28 from out of engagement with the cam surface 31 on the sleeve 26. Thereupon the sleeve 26, through the action of the spring actuated lever 27, moves to the right to effect engagement of the driving and driven elements 21 and 24, respectively, of clutch 22, whereupon the sleeve 26 rotates with the constantly rotating gear 19. The sleeve 36 moves to the right with sleeve 26 and the clutch 33 therefore remains engaged. Accordingly, at this time the sleeves 26 and 36 will rotate with the constantly rotating gear 19 and since the shaft 23 rotates with the sleeve 36, the sleeve 46 frictionally driven from the shaft 23 will also rotate. Rotation of the sleeve 46 in this manner, through the gear 48 and rack 53, effects advancement of the typewheel car 54 and this continues until the next one of the pins 52 in the collar 49 of the sleeve 46 engages the underside of the slide bar 86 whereupon further rotation of the sleeve 46 is stopped as will be further advancement of the typewheel car 54 in a letters spacing direction. The friction disks 47 frictionally coupling the sleeve 46 to the shaft 23 permit the sleeves 26 and 36 to continue rotating and complete the remainder of a revolution while the sleeve 46 is stopped.

The trip arm 28 is momentarily operated and

therefore is effective to disengage the driven and driving elements of clutch 22 following a revolution of the sleeve 26 and the shaft 17 is adapted through the proper selection of the size of gears 12 and 19 to rotate somewhat slower than gear 19. Shortly after the disengagement of the elements of clutch 22, the cam 82 operating on an arm 89 of the slide bar 86 slides the same to the right back into its normal position. This movement of the slide bar 86 effects disengagement of the elements of clutch 33 and moves the left hand end of the slide bar out of operative engagement with the engaged one of the pins 52. Thereupon the sleeve 46 may be rotated, as described, in conjunction with the normal letter, word spacing and return movement of the typewheel car 54. Thus the tabulating mechanism is returned to its normal unoperated position and during following cycles of the operation of the printer wherein the typewheel car is advanced one letter space at a time, sleeve 46 and pins 52 will rotate corresponding amounts.

With the employment of two pins 52 in the collar 49, the sleeve 46 will make one half revolution, from the beginning of one column of print to the beginning of the next. Normally, the sleeve 46 rotates step-by-step in conjunction with printing operations during the first part of a half revolution and continuously during the remainder thereof in response to a tabulating signal code combination. By locating the pins 52 in different positions in the collar 49, the amount of travel of the typewheel car from the beginning of one column of print to the beginning of the next may be varied. As pointed out the shaft 11 makes one revolution during each cycle of operation of the printer and in as much as a tabulating operation is performed in somewhat less time than that required for the shaft 11 to make a complete revolution it will be obvious that the tabulation function is effected in a period equivalent to or less than that required for a normal printer operation or function.

While the invention has been described in but one embodiment thereof, it will be obvious that various modifications may be made therein without departing from the essential attributes thereof, and it is desired that only such limitations be placed thereon as are specifically set forth in the appended claims.

What is claimed is:

1. In a printing telegraph machine having a recording web on which recording is effected in columns, a printing unit movable transversely the web step-by-step a predetermined distance in a letter spacing direction in conjunction with printing and word spacing operations, a rotatable member adapted to rotate a predetermined part of a revolution during movement of said printing unit from the beginning of one column to the beginning of the next, means for rotating said rotatable member increments of said predetermined amounts during the step-by-step advancement of said printing unit, signal controlled means for rotating said member continuously the remainder of said predetermined amount and means operative during the remainder of said rotation to continuously advance said printing unit from the end of one column of print to the beginning of the next.

2. In combination with a cyclically operable telegraph recorder having a signal responsive selector controlled recording unit movable to and fro relative to a recording web to effect letter and word spacing and the return of said unit for the

beginning of lines of print, the advancing movement of said unit in a letter spacing direction being effected step by step during certain cycles of operation of said recorder one letter space at a time, an auxiliary recorder unit advancing means having a member rotatable from one predetermined position to another predetermined position during movement of said recording unit from the beginning of one column of print to the next, means operated by said recording unit for rotating said member fractions of the distance from one predetermined position to the next during the step by step advancement of said recording unit, means determined by the position of said member for controlling the operation of said auxiliary advancing means to advance said unit continuously from any point in its path of travel to the beginning of the next column of print and means for operating said auxiliary means in a time interval not greater than that of a cycle of operation of said recorder.

3. In combination with a cyclically operable telegraph recorder having a signal responsive selector controlled recording unit movable to and fro relative to a recording web to effect letter and word spacing and the return of said unit for the beginning of a new line of print, the advancing movement of said unit in a letter spacing direction being effected by an advancing means step by step one letter space at a time, an auxiliary recording unit advancing means, said auxiliary means including a stop arm rotated a predetermined part of a revolution during advancement of said recording unit from the beginning of one column of print to the beginning of the next column, a stop member for said stop arm normally out of the path of movement thereof, means responsive to a received predetermined code group of signals on said selector to move said stop member into the path of said stop arm and rotate the latter until it engages said member, and means operative during such rotation of said stop arm to advance said unit continuously to the beginning of the next column of print and in a time interval not greater than that of a single cycle of operation of said recorder.

4. In a cyclically operable printing telegraph machine including a signal controlled selector, a recording web and a printing mechanism controlled by said selector for recording on said web, said printing mechanism and said web being relatively movable step by step in a letter spacing direction in conjunction with word and letter spacing and continuously in the opposite direction to effect recording in successive lines on said web, a tabulating mechanism for moving said printing mechanism relative to said web from any position in a line to the next one of a plurality of predetermined points whereby recording is effected in columns, a rotatable control member for said tabulating mechanism rotatable a predetermined amount during advancement of said printing mechanism from the beginning of one column to the next, said member being rotated increments of said predetermined amount during each word and letter spacing movement of said printing mechanism, a signal controlled element operable through a definite path during a single cycle of operation of said telegraph machine, and means for coupling said element to said control member and rotating the same from any intermediate position to the next one of said predetermined points whereby said printing mechanism is advanced from the end of one column to the beginning of

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the next in one cycle of operation of said telegraph machine.

5. In combination with a cyclically operable telegraph recorder having a signal responsive selector controlled recording unit movable to and fro relative to a recording web to effect letter and word spacing and the return of said unit for the beginning of a new line of print, the advancing movement of said unit in a letter spacing direction being effected by an advancing means step by step one letter space at a time, an auxiliary recording unit advancing means, said auxiliary means including a stop arm rotated a predetermined part of a revolution during advancement of said recording unit from the beginning of one column of print to the beginning of the next column, a stop member for said stop arm normally out of the path of movement thereof, means responsive to a received predetermined code group of signals on said selector to move said stop member into the path of said

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stop arm and rotate the latter until it engages said member, means operative during such rotation of said stop arm to advance said unit continuously to the beginning of the next column of print and in a time interval not greater than that of a single cycle of operation of said recorder, and means for automatically moving said stop member out of the path of said stop arm following the movement of said recording unit by said auxiliary advancing means to the beginning of a column of print.

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REFERENCES CITED

15 The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
20 2,349,674	Potts	May 23, 1944