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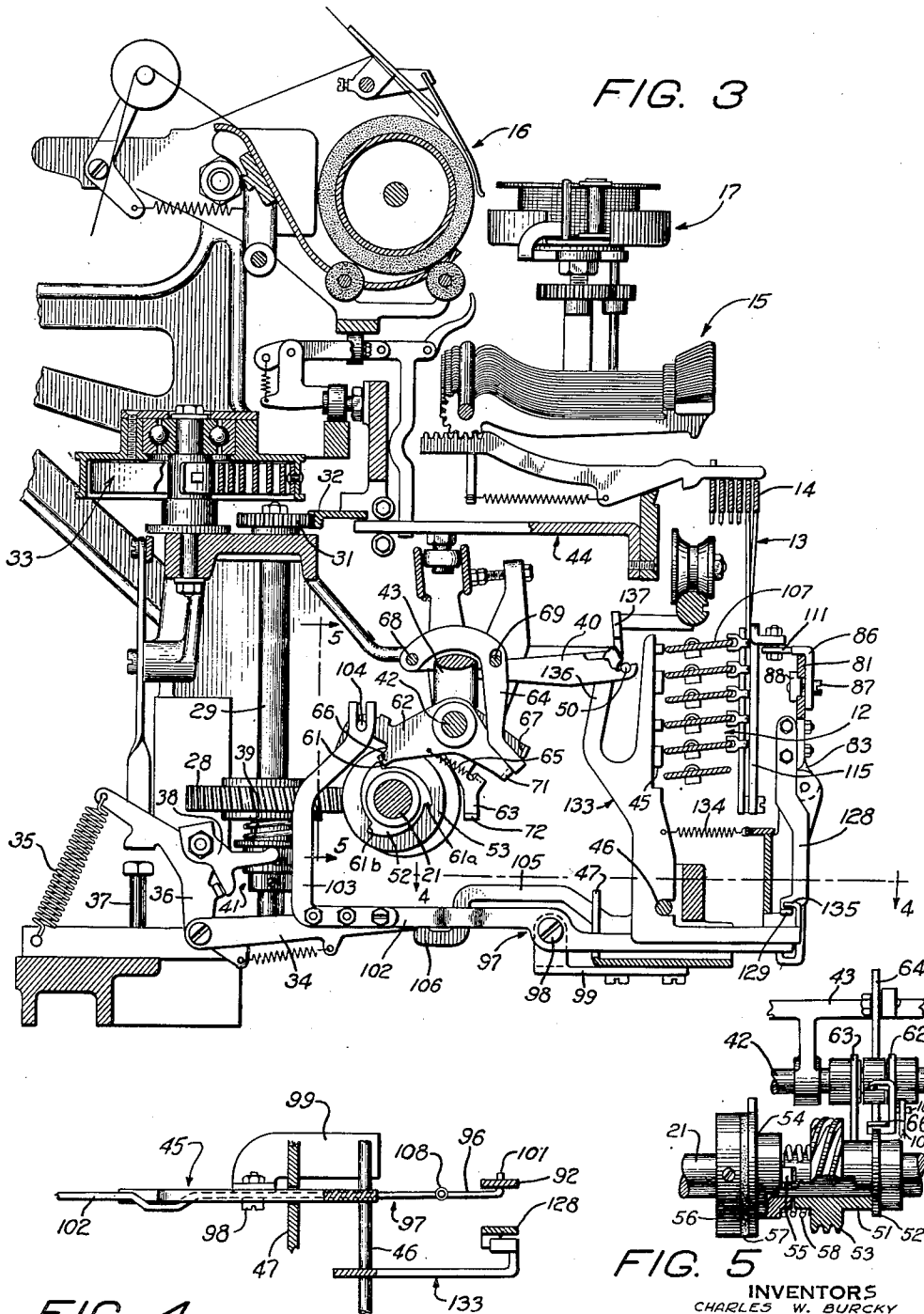
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2,023,121

PRINTING TELEGRAPH APPARATUS

Filed July 14, 1934

3 Sheets-Sheet 2



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FIG. 6

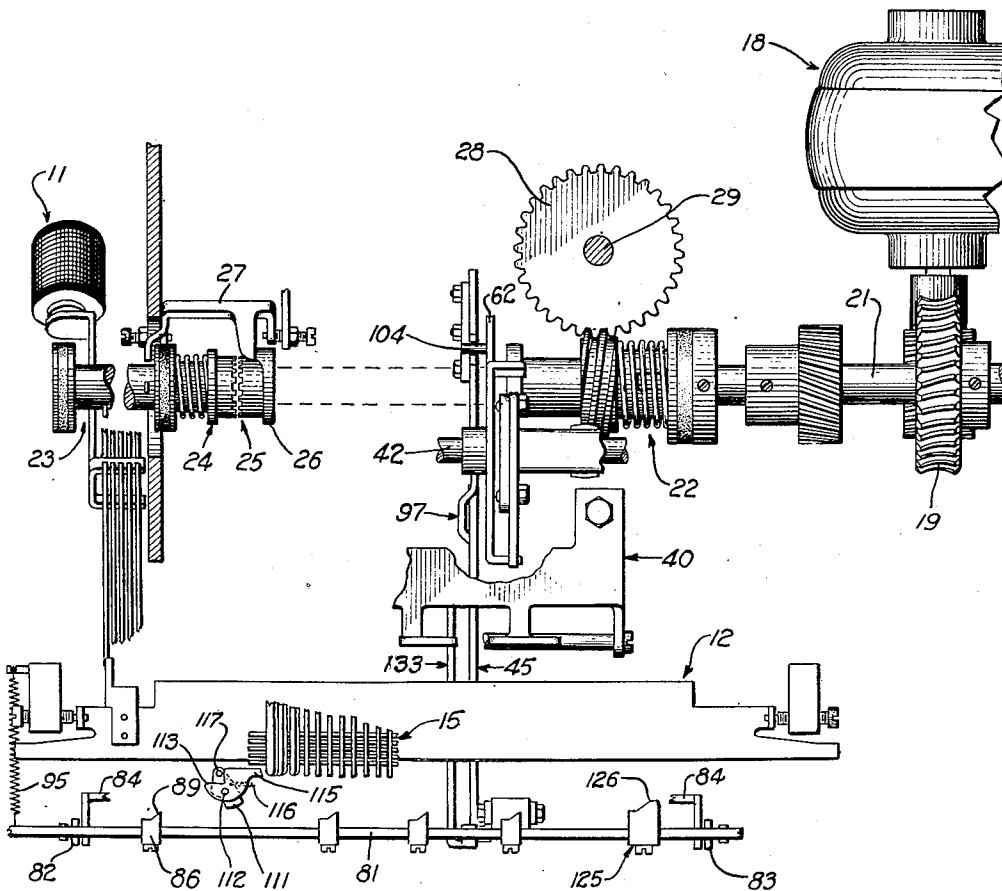
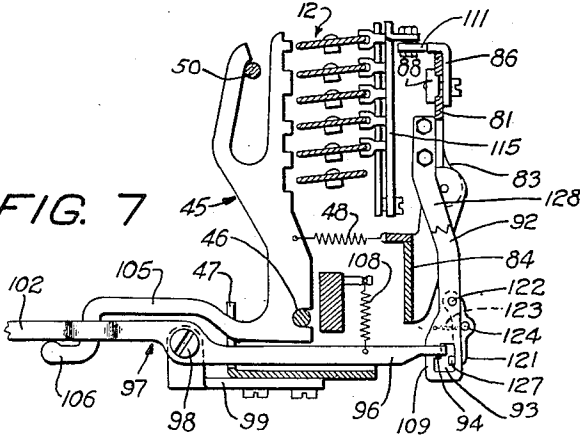


FIG. 7



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2,023,121

PRINTING TELEGRAPH APPARATUS

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Application July 14, 1934, Serial No. 735,110

24 Claims. (Cl. 178—25)

This invention pertains to printing telegraph apparatus and more particularly to improvements in tabulating mechanisms therefor.

It is the principal object of this invention to provide in a recording device a simple, efficient, and reliable tabulating mechanism which is selectively responsive to code combinations of signalling impulses for controlling tabulation recording.

A feature of the invention is the provision of means for automatically rendering the recording device ineffective in response to recording operations under predetermined conditions.

Another feature of the invention resides in the provision of a lock-out means, effective when the movable type carriage of the recorder has reached its end-of-line position, to prevent the selective operation of the tabulating device.

A further feature consists in a single lock-out means, effective when the movable carriage has reached its end-of-line position, to prevent simultaneously the performance of the tabulating, printing, and spacing functions of the recording apparatus.

The above and other objects of the present invention are accomplished by the provision in a printing telegraph apparatus of a tabulator bar which extends across the front of the machine and is pivotally carried by brackets mounted in the typing unit and capable of swinging toward and away from the type carriage. The tabulator bar carries a number of adjustable stop members which determine the positions at which the type carriage comes to rest after spacing during the tabulating cycle. The spacing mechanism of the printing apparatus comprises a three-toothed ratchet adapted to cooperate with a pair of pawls which are actuated by the printing bail to function as an escapement mechanism so that, upon each revolution of the main shaft, the spacing worm gear associated with the spacing ratchet is permitted to rotate one-third of a revolution.

A series of function levers is provided which operate selectively in accordance with the setting of a series of selector vanes. Among this series of function levers is a tabulating function lever which, when selected, is drawn forward into the selector vanes under spring tension. When this occurs, the rear extension of the function lever raises and thereby lifts the rear end of a horizontal member. When the rear end of this horizontal lever is raised, it lifts, through suitable linkage, the upper space pawl out of engagement with the tooth of the spacing ratchet, at which time the front end of said horizontal mem-

ber is lowered thereby unlatching the tabulating bar to permit the latter to be biased by its spring toward the type carriage. When the upper space pawl is thus disengaged, the lower space pawl remains in its normal position entirely free of the teeth on the escapement ratchet, thus permitting the spacing worm gear to make one complete revolution instead of only one-third of a revolution during the time that the main shaft rotates through one revolution, and therefore the carriage will be spaced continuously at a speed which is three times that of normal spacing speed. To bring the carriage to rest after tabulating it is necessary to permit the upper space pawl to drop again into engagement with a tooth on the spacing ratchet. This latter function is effected by the coaction of a cam element assembled to the carriage and one of the adjustable members carried by the tabulator bar. This cam forces or cams the tabulator bar forward or away from the carriage, against spring tension, and in doing so permits said horizontal member to be restored to its normal position into latching engagement with the tabulator bar. This restoration action of the horizontal member permits the upper space pawl again to fall into engagement with a tooth on the spacing worm ratchet, which thereupon brings the carriage to rest.

The present invention also comprises a further latching means for preventing the initiation of the tabulation operation after the movable type carriage has reached the end of a line, as well as means for simultaneously locking out automatically the printing and spacing functions. These features are accomplished by the provision of an adjustable member on the tabulator bar similar to that previously alluded to except that it is provided with an enlarged cam portion which acts to swing the tabulator bar outwardly or away from the type carriage a greater extent than normally, thus rendering the lock-out means effective.

A better understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawings wherein,

Fig. 1 is a partial front elevation of the printing apparatus showing the application of the tabulating and lock-out mechanisms thereto;

Fig. 2 is a perspective view of the tabulating and lock-out mechanisms applied to said printing apparatus;

Fig. 3 is a transverse cross-sectional view of the printer in accordance with said patent, taken

approximately through the vertical center line of Fig. 1;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a detail rear elevation of the spacing mechanism of the printing apparatus covered by said patent;

Fig. 6 is a sectional plan view of the printing apparatus corresponding to Fig. 11 in Patent No. 1,904,164, with the addition of the tabulating and lock-out mechanisms of the present invention, and

Fig. 7 is a sectional view showing the tabulating lockout mechanism.

In the accompanying drawings like reference characters indicate similar parts throughout.

For a complete understanding of details not disclosed herein which form no part of the present invention, reference may be had to U. S. Patent No. 1,904,164, issued April 18, 1933, to S. Morton et al. Reference may also be had to copending application Serial No. 735,094 filed July 14, 1934, between which and the present application there is community of subject matter.

Briefly, having reference to Figs. 1, 3, and 6, a printing apparatus to which the tabulating mechanism of the present invention is applied comprises a typing unit (shown generally in section in Fig. 3) which includes a primary selecting mechanism indicated generally as 11 (Fig. 6) which is of the sword-and-T type disclosed in U. S. Patent No. 1,745,633 to S. Morton et al. (fully disclosed in the first mentioned patent), and a secondary selector or selector vane assembly indicated generally as 12. The selector vane assembly 12 controls through a series of bell cranks 13 (Fig. 1) a corresponding series of curved code bars 14 carried in a movable type carriage. As set forth in the first mentioned patent, this type carriage, indicated generally as 15, is movable longitudinally in respect to a stationary platen indicated generally as 16 (Fig. 3). The type carriage 15 also carries a ribbon feed mechanism indicated generally as 17.

Referring particularly to Fig. 6, a motor 18 supplies power through gear 19 to a main operating shaft 21 which carries the spacing mechanism indicated generally as 22 and the selector cam assembly indicated generally as 23. As is known in this type of device, power is communicated from the motor to the driven shaft through a grab clutch such as 25. Portion 24 of grab clutch 25 constantly rotates with the shaft 21, which has also frictionally connected thereto the spacing mechanism 22 and the selecting cam drum 23. Portion 24 is cooperatively engaged with the driven portion 26 when throw-out lever 27 is operated in timed relation with the reception of code signals.

The spacing mechanism 22, which will be described more in detail hereinafter, controls through gear 28, shaft 29, gear 31, and rack 32 (Fig. 3), the movement of type carriage 15 to form character spaces, tending in this movement to wind up the carriage return spring mechanism indicated generally as 33. Upon receipt of the carriage return signal, function bar 34 is actuated selectively in the manner described in Patent No. 1,904,164 so as to permit spring 35 to rotate lever 36 suddenly against stop 37 to raise, through bell crank 38, portion 39 of grab clutch 41. Carriage return mechanism 33 is thereupon permitted, due to the energy stored up therein, to return the carriage 15 to its normal or beginning-of-line position.

Positioned in operative relation with and parallel to the main operating shaft 21 is an auxiliary shaft 42 on which are carried various mechanisms, for example, printing ball 43, function ball 40 and the escapement mechanism for the spacing mechanism 22. The printing ball 43, which is actuated by a printing spring (not shown) in proper timed relation in the operative cycle, functions to reciprocate a pull bar operating member 44 to cause the operation of a type bar, as clearly described in the aforementioned patent.

The selector vanes as set forth in Patent No. 1,904,164 control a series of function levers among which and provided especially for accomplishing the objects of the present invention are a tabulating function lever 45 (Fig. 7) and a lock-out function lever 133 (Fig. 3), which like the other function levers described in said patent are pivoted on a common pivot rod 46 and are assembled in a slot in the function lever comb 47. These function levers 45 and 133, like the rest of the function levers of the series, are provided with individual springs 48 and 134, respectively, tensioned between each and the printer frame 25 which tend to rotate the respective function levers 45 or 133 about pivot 46 but, as clearly set forth in Patent No. 1,904,164, are restrained by the function lever ball 40 acting through rod 50 on arm 136.

Before describing further the function of lever 45, a detailed description of the spacing mechanism will be given. Having reference to Figs. 3 and 5 there is shown mounted on the main shaft 21 and located centrally of the apparatus a sleeve member 51 which comprises escapement ratchet 52 and escapement worm 53 which are operably connected thereto. Sleeve member 51 is operably connected to the hub of a disc 54 by means of interengaging tongue and groove members 55. Collar 56 is pinned to main shaft 21 and is rotatable therewith. Interposed between disc 54 and collar 56 is disc 57 of frictional material; for example, felt. By means of a helical compression spring 58, sleeve 51 is frictionally connected to shaft 21 through the friction clutch comprising members 54, 56, and 57. Sleeve 51 is thereby rotatable with main shaft 21 unless arrested by the escapement pawls of the spacing mechanism 22 as will presently appear.

Referring to Fig. 3 it will be noted that ratchet 52 is provided with three teeth or notches 61, 61a, and 61b, the escapement of which will allow the type carriage 15 to be moved forward one step or character space for each actuation of the printing ball 43. As indicated, the escapement mechanism comprises levers 62 and 63, pivotally mounted on ball shaft 42, and lever 64 adjustably fixed to printing ball 43. Spring 65 normally tends to rotate levers 62 and 63 in opposite directions, since it is common to both levers. Lever 62 is normally urged by spring 65 in a counter-clockwise direction so that laterally disposed end 66 engages tooth 61 of ratchet 52, thus arresting the rotation of said ratchet. Lever 63 is normally held out of engagement with ratchet 52 against the tension of spring 65 by the action of lever 64 against laterally disposed end 67.

Lever 64 is pivotally connected to printing ball 43 at 68 and is provided at 69 with a slot and screw adjusting means, whereby the correct relative position of escapement levers 62 and 63 with respect to ratchet 52 may be determined. The spacing operation occurs immediately following

or subsequent to the printing of a character in the following manner.

Upon the printing of a character, lever 64 is caused to rotate slightly in a clockwise direction with printing ball 43 which moves clockwise about bail shaft 42, thereby transferring this motion to lever 62 through its laterally disposed end 71, tripping its end 66 out of engagement with tooth 61 and permitting ratchet 52 to rotate slightly in a clockwise direction under the influence of friction clutch members 54 to 57 (Fig. 5) until arrested by the engagement of tooth 61a with laterally disposed end 72 of lever 63 which lever was free to rotate in a clockwise direction under the tension of spring 65 into the path of oncoming tooth 61a. Ratchet 52 is thus restrained from rotation by lever 63 until the completion of the printing of a character at which time printing ball 43 and associated lever 64 are caused to rotate in the opposite direction by the action of a printing cam (not shown). Restraint of lever 62 by lever 64 through end 71 is thereby removed, permitting lever 62 to rotate in a counterclockwise direction under the influence of spring 65 into the path of tooth 61b of ratchet 52. During this counterclockwise movement of lever 64, and immediately after the aforementioned release of lever 62, lever 63 is caused to rotate in a like direction due to the action of lever 64 on end 67 thereof, thereby disengaging end 72 of lever 63 from tooth 61a and allowing ratchet 52 to continue its rotation until arrested by the engagement of end 66 of lever 62 with tooth 61b.

It is obvious that since worm 53 and ratchet 52 are integrally connected to sleeve 51, said worm 53 will have normally the same intermittent or step-by-step motion as was hereinbefore seen to be imparted to ratchet 52. Worm 53 is meshed with worm gear 28 (Figs. 3 and 6) which is loosely mounted on vertical shaft 29, and is operably connected thereto by means of jaw clutch 41. Worm 53 and gear 28 are so related that one-third revolution of worm 53 will rotate gear 28 through a distance which, through gear 31 and rack 32 causes the type carriage to be stepped forward one character space.

From the foregoing it will be observed that character spacing takes place automatically with the printing of each character; that is, the spacing function is merged into the printing operation. It is well known that there is a code combination allotted to each type bar, but it is possible, however, to employ a code combination, commonly known as the spacing sign¹, which is identified with no type bar but which will nevertheless initiate the printing operation. Therefore, the spacing between words is accomplished in exactly the same manner as set forth when a spacing signal is received, except that no type bar is operated and consequently no character is printed.

In accordance with the present invention, continuous spacing may be effected upon the receipt of a code combination known as the tabulating code combination which functions to initiate the operation of the tabulating mechanism.

The mechanically operated tabulating arrangement of the present invention comprises a tabulator bar 81 extending across the front of the printing apparatus, as shown in Fig. 1, which is provided with depending portions 82 and 83 through which bar 81 is pivotally mounted on bracket 84 carried in the printer frame. Thus tabulator bar 81 is adapted to be swingable toward or away from the type carriage 15. Bar 81

is also provided with a longitudinal slot 85 extending substantially the entire length of the bar. Into this slot are adjustably movable stop members 86 which are adapted to be clamped to the bar 81 by means of screws 87 and clamps 88 individual to each stop member 86 (Fig. 3). As indicated in Fig. 6, these stop members 86 are each provided with an inclined or cam portion 89, specially conformed so as to provide quick action upon cooperation with a cam element 111 carried by the type carriage, to terminate suddenly the tabulating operation.

Tabulator bar 81 is also provided, intermediate the depending portions 82 and 83 (Fig. 1) and suitably positioned relative to function lever 45, with another depending portion 91. Attached to and depending from portion 91 is a bar 92 the lower end of which is provided with an aperture 93 having its upper left-hand corner (as viewed in Fig. 7) conformed so as to provide a reentrant stepped portion 94. The tabulator bar 81, as indicated in Fig. 6, normally tends to move toward the printing apparatus due to the action of a spring 95.

Cooperating with the stepped portion 94 (Fig. 25) is one arm 96 of a lever 97 pivotally carried at 98 on a support 99 secured to the function lever comb 47. The extremity of arm 96 is provided with a laterally disposed portion 101 (Fig. 4) which cooperates with portion 94 of member 92. At the end of arm 102 of lever 97 (Fig. 3) is rigidly carried a vertically extending member 103 the upper end of which is provided (in the present embodiment) with an open ended slot adapted to engage a pin 104 carried by escape-ment lever 62.

Function lever 45 is provided with a horizontal portion 105 (Figs. 3 and 7) so conformed that its extremity 106 engages the lower edge of arm 102 of lever 97 such that when function lever 45 is permitted to rotate in a clockwise direction under the action of its spring 48 upon the proper setting of the vanes 107 in response to the tabulation code signal, the end 106 thereof is elevated, causing lever 97 to rotate slightly in a clockwise direction against the tension of its spring 108. The end 101 of arm 96 is thus moved downwardly clear of portion 94, thus permitting spring 95 to urge the tabulator bar 81 inwardly (or toward the left as viewed in Fig. 7) until wall 109 of member 92 engages lug 101. The series of adjustable stops 86 are thus moved inwardly into the path of a cam member 111 (Figs. 3 and 6) pivoted at 112 on a portion 113 integrally formed on a bar 115 which is comparable to bar 53 shown in Fig. 1 of Patent No. 1,904,164 employed for retaining the bell crank levers 13 in operable relation to vanes 107. Thus cam 111, like bar 115 and bell cranks 13, is movable with the type carriage 15 for character spacing. Cam 111 normally tends to rotate in a clockwise direction about pivot 112 due to the action of spring 116, but its clockwise rotation is limited by the coaction of a stop pin 117, carried thereon, with the end of bar 115. Thus upon the rightward movement of type carriage 15 (Fig. 6) cam 111, due to its non-rotatability in a clockwise direction, will, by its camming action on stop member 86, actuate tabulator bar 81 outwardly; but upon the leftward movement of type carriage 15, cam 111 upon striking the series of stop members 86 will be rotated counterclockwise against the action of spring 116 sufficiently to escape the cam portion 89.

Upon the clockwise rotation of lever 97 due to

the selection of function lever 45, arm 102 and consequently portion 103 carried thereon will be raised and in so doing will, through pin 104, lift escapement lever 62 out of engagement with the teeth of the ratchet 52 which, since the lever 62 is prevented from engaging the teeth of the ratchet 52 due to its being held in inoperative position by lever 64, permits the worm gear to make one complete revolution instead of one-third of a revolution during the time that the main shaft rotates through one revolution, and therefore the carriage will be spaced continuously at a speed which is three times that of normal spacing so long as the escapement lever 62 is held out of operative engagement with ratchet 52, which, as we have seen, is maintained in this position due to the engagement of lug 101 with the under side of step portion 94. Thus carriage 15 will be moved continuously until cam 111 coacts with one of the series of stops 86, when cam 111 will urge through stop 86 tabulator bar 81 outwardly, as viewed in Fig. 6 (or in a clockwise direction as viewed in Fig. 7), the effect of which is to disengage lug 101 from portion 94, whereupon lever 97 will again be rotated in a counter-clockwise direction by its spring 108 into the position shown in Fig. 7, in which event portion 103 (Fig. 3) carried on arm 102 of lever 97 will again be lowered, permitting escapement lever 62 under action of spring 65 to engage one of the teeth 61, 61a, or 61b of the ratchet 52.

The function lever 45, however, will have been returned to its non-selective position, as shown in Fig. 7, at the completion of the first revolution or cycle of operation of the main shaft 21 because of the fact that during the cycle pursuant to the reception of the tabulating signal, the function ball 40 will have been reciprocated once so that shaft 50, upon the down-stroke of ball 40, will permit spring 48 to urge lever 45 into co-operative relation with vanes 107 only so long as to effect the selection, and hence the resulting disengagement of pawl 62 whereafter shaft 50 upon its upward or return movement will cause the function lever 45 through arm 136 thereof away from the vanes 107 where it will be held inoperative until the reception of another tabulation code signal, pursuant to which the foregoing cycle of operations will again occur.

A feature of the present invention resides in the provision of a latching means for preventing the initiation of the tabulation operation after the movable type carriage 15 has reached the end of a line, thus preventing damage to the printing apparatus caused by jamming. This feature is clearly shown in Fig. 7 wherein a latch 121 is pivotally carried at 122 on arm 92 and is spring-urged in a clockwise direction as viewed in Fig. 7 by a spring 123 so that stop pin 124 carried on latch 121 bears against the outer edge of arm 92 (also shown in Fig. 2).

To achieve the tabulation lock-out function there is also adjustably carried on the tabulator bar 81 adjustable member 125 which, as shown in Fig. 6, is larger than stops 86 and is provided with a higher cam portion 126 so that when the cam 111 carried on the movable carriage 15 coacts therewith, the tabulator bar 81 will be caused to rotate a much greater extent. As indicated, a dwell of substantial length is also provided on the inner edge of member 125 to prevent premature return of bar 81 to its inward position. This movement, as viewed in Fig. 7, will also cause depending arm 92 to swing leftwardly a greater amount, or such that projection 127 of latch 121

is positioned beneath lug 101 of arm 96 of the tabulation lever 97; thus in this condition the reception of a tabulation code signal will have no effect since, even if function lever 45 should attempt to rotate under the action of its spring 48 in response to the tabulation signal, it will be restrained therefrom due to the impossibility of rotating, through its arm 105, lever 97 in a clockwise direction because at this time latch 121 is in a position to prevent such rotation. Of course, upon the reception of the carriage return signal, the movable type carriage 15 will be returned to its beginning of line position and tabulator bar 81 will again be permitted to swing inwardly as viewed in Fig. 7, under the action of its spring 95, thus retracting latch 121 from lug 101.

The present invention also provides the feature of locking out automatically the printing and spacing functions when the type carriage 15 has reached the end of the line. This feature is desirable in the event that the carriage return signal is lost or transformed in transit or by its losing or gaining an impulse, thereby changing the identity of the signal. Therefore, if a carriage return code signal is thus lost or transformed, the type carriage 15 will not be returned at the end of the line preparatory to beginning the next line, and the spacing and printing operation will continue to be performed, thus tending to urge the type carriage 15 beyond the limits of its movement and consequently causing damage to the mechanism.

To preclude this possibility the tabulator bar 81, as shown in Figs. 1, 2, and 3, is provided with a second depending bar 128 adjacent the previously mentioned bar 92. Bar 128 has formed at its lower extremity a laterally disposed portion 129 which coacts with the specially formed end 131 of arm 132 of a special locking-out function lever 133 (Figs. 2 and 3). Lever 133 is devoid of code notches and is pivotally mounted on function lever shaft 46 and is adapted to be urged toward the selector vanes 107 by a spring 134 individual thereto. Thus when the type carriage 15 has reached its end-of-line position and has coacted with adjustable stop 125 to move tabulator bar 81 to a greater extent than normally, as previously described in connection with the tabulator lock-out function, the bar 128 will be swung in a clockwise direction, as viewed in Fig. 3, so that its laterally disposed end 129 will be entirely clear of the arc described by the end 135 of portion 131 of special function lever 133. In view of this movement of tabulator bar 81 and bar 128, special function lever 133 is free to move in a clockwise direction under the action of its spring 134 so that the upper extremity of arm 136 of the function lever 133 will be disposed beneath an upturned edge 137 (Figs. 2 and 3) formed on the function lever ball 40, as fully described in Patent No. 1,904,164.

Briefly, as described in said patent, the function lever ball 40 is provided with upturned edges 137 which are adapted to span certain of the function levers wherein it is desired to prevent printing or spacing operations, this being effected by permitting arms 136 of such function levers to intercept the upturned edges 137 after only a limited movement thereof, sufficient to prevent the spacing and printing functions. Of course, as fully described hereinbefore, the shaft 50 of the function ball 40, due to its camming action on the inner surface of arm 136 invariably returns the function levers to their normal or inoperative position. Thus, so long as the type carriage 15

remains in its end-of-line position and holds tabulator bar 81 cammed outwardly so that lug 129 of lever 128 clears portion 135 of function lever 133, the printing and spacing operations will be prevented because of the blocking relationship between upturned edge 137 of function lever bail 40 and the arm 136 of function lever 133. Upon return of the type carriage 15 to its beginning-of-line position, tabulator bar 81 and bar 128 will assume their perpendicular position, portion 129 being thereby again disposed beneath inturned portion 135 of function lever 133. It is to be understood that lug 129 will clear portion 135 only when tabulator bar 81 has been actuated to the greater extent by adjustable stop 125, and hence, when cam 111 coacts with stops 86, member 128 will not be moved sufficiently to disengage lug 129 from portion 135.

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

What is claimed is:

1. In a recorder, means to effect recording operations, means to limit the movement of said means to a single character space at a time, means to render said second recited means ineffective to limit the movement of said first recited means to single spaces, and means effective under predetermined operating conditions to prevent simultaneously the operations of all of said means.

2. In a recorder, elements movable normally one character space, means for causing said elements to advance through a plurality of spaces at a time from one recording position to another, and means effective when said elements have reached a predetermined position for rendering said first recited means inoperative.

3. In a recorder, elements movable normally one character space, means operable under certain operating conditions for causing said elements to advance through a plurality of spaces at a time from one recording position to another, and means operable under other operating conditions effective simultaneously to render said first recited means inoperative and said elements immovable.

4. In a recorder, a traveling carriage, recording mechanism cooperating therewith, means for effecting the normal spacing movement of said carriage, other means for effecting the continuous movement of said carriage through variable sequences of character spaces, and further means for automatically and simultaneously rendering said recording mechanism and said first and second recited means inoperative after said carriage has reached a predetermined position.

5. In a recorder, recording elements, means operable normally to move said device one character space upon each recording operation, means for causing said recording elements to advance through a plurality of spaces at a time from one recording position to another, and lock-out means effective when said recording elements have reached a predetermined position to prevent the operations of both said means.

6. In a recorder, a traveling carriage, recording mechanism cooperating therewith, means for effecting the normal spacing movement of said carriage, means for effecting the continuous movement of said carriage through variable sequences of character spaces, and a single lock-out means effective when said carriage has reached a predetermined position to prevent

simultaneously the operations of the recording mechanism and both said means.

7. In a telegraph printer, printing mechanism, spacing mechanism to limit the movement of said mechanism to a single character space at a time, tabulating mechanism for rendering said spacing mechanism ineffective to limit the movement of said mechanism to single spaces, and a single lock-out means effective under predetermined operating conditions to prevent simultaneously the operations of all of said mechanisms.

8. In a recorder, elements movable normally one character space, means for causing said elements to advance through a plurality of spaces at a time from one recording position to another, and means associated with said means for automatically rendering said elements ineffective in response to recording operations under predetermined conditions.

9. In a recorder, a carriage movable to form character spaces, a plurality of recording elements mounted in said carriage, means to perform functions other than recording, a permutation device movable with said carriage to determine the character to be recorded, a stationary permutation device to control said means and said permutation device, a tabulating device controlled by said means for causing said carriage to advance through a plurality of spaces at a time from one recording position to another, and means for rendering said tabulating device inoperative when said carriage has reached a predetermined position.

10. In a telegraph printer, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to advance said carriage one character space just subsequent to a printing operation, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operative in response to the selective operation of a certain one of said levers to effect the continuous movement of said carriage a predetermined plurality of character spaces at a time, and means effective when said carriage has reached a predetermined position to render said certain one of said levers unresponsive, whereby said tabulating mechanism is rendered inoperative.

11. In a telegraph recorder, a carriage movable to form character spaces, a spacing mechanism therefor normally adapted to control the advancement of said carriage one character space upon each operation thereof, said spacing mechanism comprising a pair of spring-biased pawls acting to afford an escapement therefor, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operative in response to the selective operation of a certain one of said levers to effect, through the instrumentality of said lever, the disablement of one of said pair of pawls to control the advancement of said carriage continuously through a plurality of spaces at a time, and means effective when said carriage has reached a predetermined position to render said tabulating mechanism unable to effect the disablement of said one of said pair of pawls.

12. In a telegraph recorder, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to control the advancement of said carriage one character space upon each operation thereof, said spacing mechanism including a spacing ratchet, a pair of pawls and

a single spring means to render said pair of pawls coactive with said ratchet in escapement manner, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operative in response to the selective operation of a certain one of said levers to effect, through the operation of said lever, the disengagement of one of said pair of pawls to release said carriage for advancement continuously through a plurality of spaces at a time, and means effective when said carriage has reached a predetermined position to render said certain one of said levers inoperative, whereby said tabulating mechanism is rendered ineffective.

13. In a telegraph recorder, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to control the advancement of said carriage one character space upon each operation thereof, said mechanism embodying an escapement device including a pair of pawls and means to bias said pawls attractively, tabulating mechanism effective under certain operating conditions to disable one of said pair of pawls to control the advancement of said carriage continuously through a plurality of spaces at a time, and means effective when said carriage has reached a predetermined position to render said tabulating mechanism ineffective to disable one of said pair of pawls.

14. In a telegraph recorder, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to control the advancement of said carriage one character space upon each operation thereof, said mechanism embodying an escapement device including a pair of pawls and means to bias said pawls attractively, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operative in response to the selective operation of a certain one of said levers to disable, through the operation of said lever, one of said pair of pawls to release said carriage for advancement continuously through a plurality of spaces at a time, and means effective when said carriage has reached a predetermined position to prevent the operation of said tabulating mechanism.

15. In a telegraph recorder, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to control the advancement of said carriage one character space upon each operation thereof, said mechanism embodying an escapement device including a pair of pawls and means to bias said pawls attractively, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, a tabulating mechanism comprising a pivotally mounted stop plate, a manually adjustable stop member adapted to be positioned at any one of a plurality of points along said stop plate, a projection on said carriage cooperable with said positioned stop member, and a depending latch portion coactive with an extension on one of said code levers, said tabulating mechanism operative in response to the selective operation of said extension carrying code lever to disable one of said pair of pawls to release said carriage for advancement continuously through a plurality of spaces at a time, and means effective under certain operating conditions to render said tabulating mechanism ineffective.

16. In a telegraph recorder, a carriage movable to form character spaces, means comprising a multi-toothed disc, the number of teeth being

equal to the number of spacing operations per revolution of said disc, to effect said spacing movement, a ball movable in a complete cycle for each character spacing operation, detent means mounted in said ball whereby the movement of said ball during each spacing operation causes the escapement of said disc to effectuate the spacing movement of said carriage, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operative in response to the selective operation of a certain one of said levers to disable, through the operation of said lever, said detent means to control the advancement of said carriage continuously through a plurality of spaces at a time, and means effective under certain operating conditions to prevent the selective operation of said certain one of said levers, whereby the tabulating mechanism is rendered ineffective.

17. In a telegraph recorder, a carriage movable to form character spaces, means comprising a multi-toothed disc, the number of teeth being equal to the number of spacing operations per revolution of said disc, to effect said spacing movement, a ball movable in a complete cycle for each character spacing operation, detent means mounted in said ball whereby the movement of said ball during each spacing operation causes the escapement of said disc to effectuate the spacing movement of said carriage, tabulating mechanism effective under certain operating conditions to disable said detent means to control the advancement of said carriage continuously through a plurality of spaces at a time, means effective under other operating conditions to render said tabulating mechanism ineffective, and means operative when said carriage reaches a predetermined position to prevent the movement of said ball.

18. In a telegraph recorder, a single magnet responsive to received code combinations of impulse conditions, a plurality of recording elements, a plurality of selecting members controlled by said magnet for selectively operating said elements, guiding and supporting means, a carriage mounted for reciprocation on said guiding and supporting means, said elements and members being mounted on said carriage, a rack mounted on said carriage, a driven spacing worm cooperable with said rack, spacing mechanism for actuating said worm normally in a step-by-step manner to effect character spacing of said carriage, means responsive to said magnet comprising a plurality of function code levers for controlling operations other than recording, tabulating mechanism operative in response to the selective operation of a certain one of said levers to disable said spacing mechanism to release said carriage for advancement continuously through a plurality of spaces at a time, means effective under other operating conditions to render said tabulating mechanism ineffective, and means operative when said carriage reaches a predetermined position to prevent simultaneously the actuation of said spacing mechanism and the operation of said recording elements.

19. In a recorder, means to effect recording operations, means operable in cycles to actuate said means to effect character spacing, means to limit the movement of said recording means to a single character space for each cyclic operation of said cyclically operable means, means to disable said limiting means to allow advance of said recording means a plurality of character spaces for each cycle of operation of said cyclically operable

means, and means effective under predetermined operating conditions to prevent the operation of said disabling means.

20. In a recorder, means to effect recording operations, means to limit the movement of said means to a single character space at a time, means to render said second recited means ineffective to limit the movement of said first recited means to single spaces, and means effective under predetermined operating conditions to prevent the operation of said last recited means.

21. In a recorder, elements movable normally one character space, means for causing said elements to advance through a plurality of spaces at a time from one recording position to another, and means effective when said elements have reached a selectable position for rendering said first means inoperative.

22. In a recorder, a traveling carriage, recording mechanism cooperating therewith, means for effecting the normal spacing movement of said carriage, other means for effecting the continuous movement of said carriage through variable sequences of character spaces, and further means for automatically and simultaneously rendering said recording mechanism and said first and second recited means inoperative after said carriage has reached a selectable position.

23. In a recorder, recording elements, means operable normally to move said device one character space upon each recording operation, means for causing said recording elements to advance through a plurality of spaces at a time from one recording position to another, and lock-out means effective when said recording elements have reached a selectable position to prevent the operations of both said means.

24. In a telegraph printer, a carriage movable to form character spaces, spacing mechanism therefor normally adapted to advance said carriage one character space just subsequent to a printing operation, permutation code mechanism to control operations other than recording comprising a plurality of function code levers, tabulating mechanism operable in response to the selective operation of a certain one of said levers to effect the continuous movement of said carriage a predetermined plurality of character spaces at a time, and means effective when said carriage has reached a selectable position to render said certain one of said levers unresponsive whereby said tabulating mechanism is rendered inoperative.

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