Nov. 26, 1946. R. A. LAKE 2,411,794

RECORDER CONTROL MECHANISM

Filed Dec. 30, 1943 2 Sheets-Sheet 1

FIG. 1

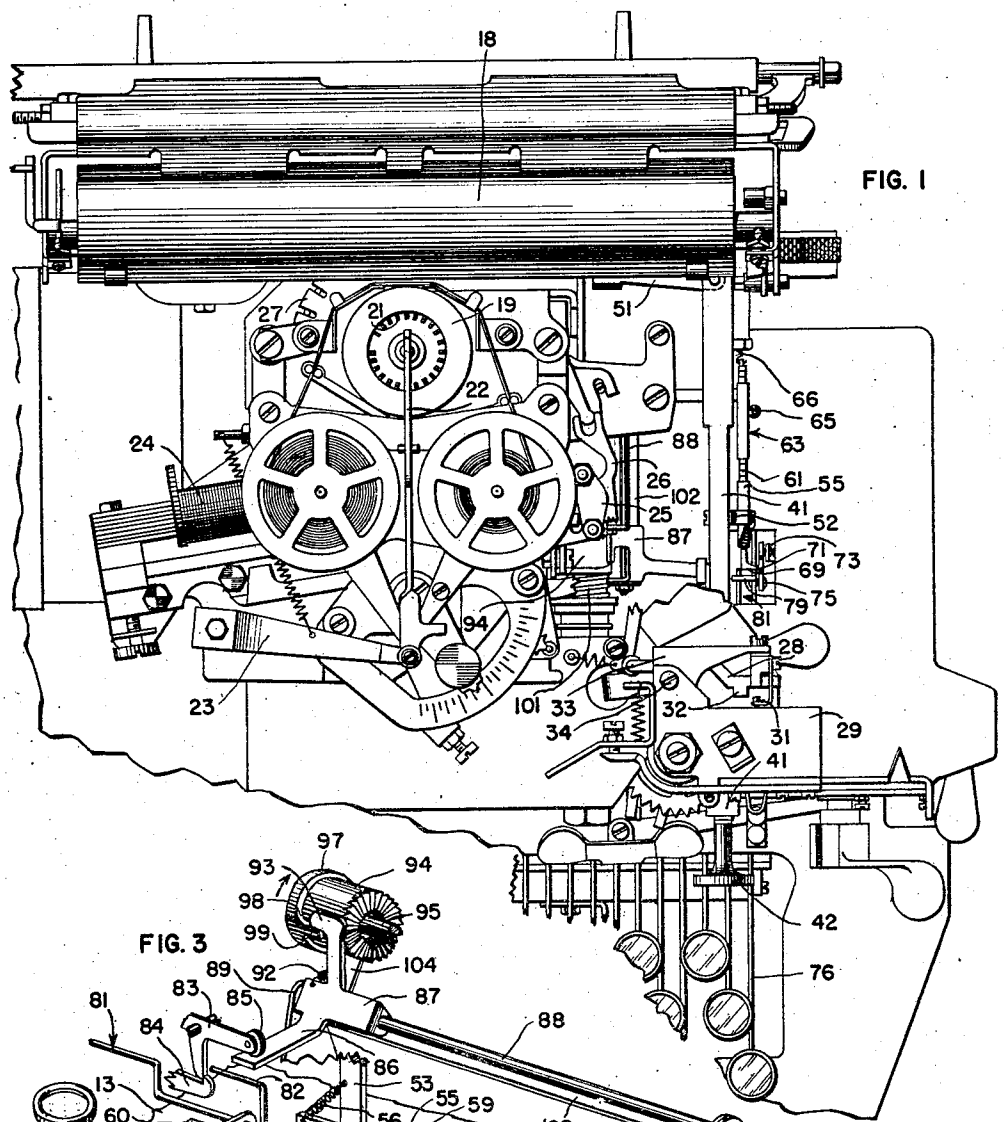


FIG. 3

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Filed Dec. 30, 1943 2 Sheets-Sheet 2

FIG. 5

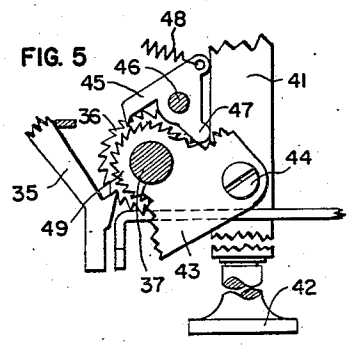


FIG. 4

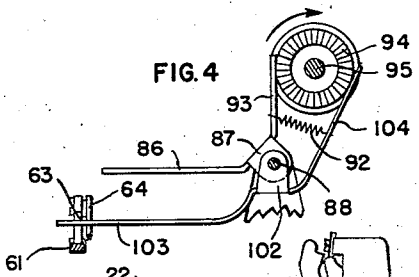
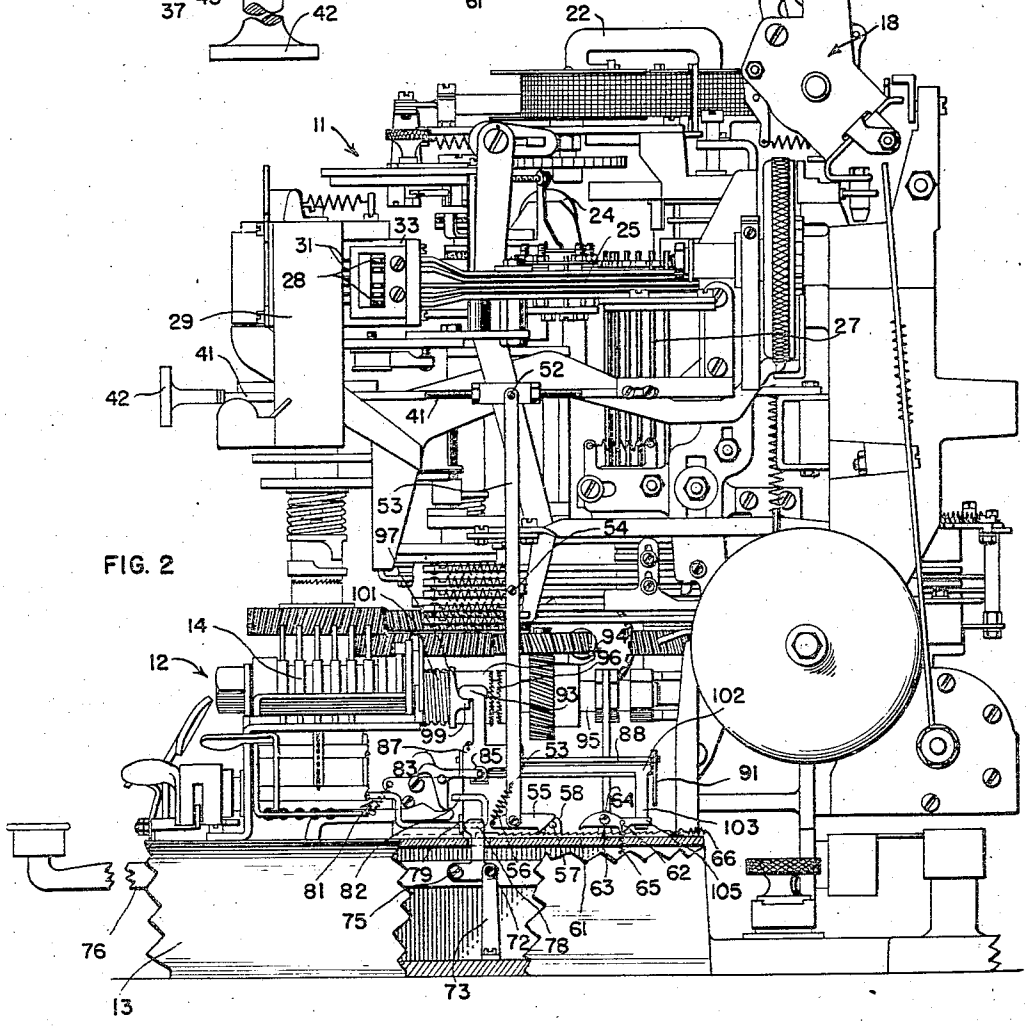


FIG. 2



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UNITED STATES PATENT OFFICE

2,411,794

RECORDER CONTROL MECHANISM

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Application December 30, 1943, Serial No. 516,195

8 Claims. (Cl. 178—92)

1

This invention pertains to printing telegraph recorders and particularly to combination printing and perforating apparatus for the simultaneous preparation of a printed record and a perforated record.

The primary object of the invention is to provide in a perforator a device which takes cognizance of the number of code combinations of perforations which have been backspaced and which is subsequently effective automatically to delete only those code combinations which were backspaced.

Specifically, the present invention concerns the provision of certain facilities to enhance the operation of the combination printer and perforator shown in copending application, Serial No. 496,551, filed July 29, 1943, by A. H. Reiber. Said copending application discloses a page printer of the type shown in U. S. Patent No. 2,247,408 modified to incorporate a tape perforating device which is connected to and controlled by the selector mechanism of the page printer, so that simultaneous records are made on the page material and on the tape. In such combination printing and perforating devices, means is provided for correcting the page record and the tape perforated record simultaneously. In performing this operation the tape record is first backspaced, and after backspacing a sufficient number of characters representing the material to be deleted, the tape is again forward spaced, and simultaneously therewith the backspaced characters are then cancelled or deleted by perforating thereover a rub out signal. To make the record on the page agree with the perforated record, there is provided in the printer according to the copending application a means for simultaneously backspacing the printed record in correspondence with the backspacing operation of the perforated tape. Thus, when this correcting operation is performed the record on the page corresponding to the deleted record on the tape is cancelled by printing thereover a cancellation character.

It is a feature of the present invention to provide a mechanism which is operable initially by the backspacing instrumentalities of the perforator to condition a counting device in accordance with the number of backspaced code combinations of perforations to be deleted, and subsequently, by holding down the rub out or cancelling key, to delete only as many code combinations as have been backspaced, and no more.

Briefly, the device according to the present invention comprises a rack bar which is actuated step-by-step by a pawl under the control of the backspace key of the perforating unit. For each operation of the backspace key, the rack bar is moved the distance of one tooth and is maintained in this position by a detent means so that

2

the cumulative actuations of said rack bar are commensurate with the number of actuations of the backspace key. Then in response to the operation of the rub out key, the transmitting cam shaft clutch is tripped and causes the transmitting cams to be rotated continuously so long as the rub out key lever is held depressed until the clutch is disengaged automatically, even though the rub out key is held depressed, by mechanism incorporated in the device of the present invention. The transmitting cam shaft has also a cam which operates on an escapement mechanism to release or return the rack bar step-by-step to its normal position.

A more complete understanding of the present invention may be had from the following description when taken in conjunction with the accompanying drawings, wherein like reference characters are used to designate similar parts throughout the several views, and wherein:

Fig. 1 is a plan view of the combination printing and perforating apparatus embodying the present invention;

Fig. 2 is a side elevational view of the printer shown in Fig. 1;

Fig. 3 is an enlarged perspective view of a portion of the apparatus shown in Figs. 1 and 2 illustrating the device according to the present invention;

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

Fig. 5 is a fragmental sectional view of the forward spacing and backspacing instrumentalities of the perforating mechanism.

Having reference to Fig. 2 of the drawings, the numerics 11 and 12 denote generally the typing unit and the keyboard transmitting unit, respectively, of the printing telegraph apparatus shown in the afore-mentioned patent and copending application. The keyboard apparatus 12 comprises a base portion 13 on which is mounted the transmitting contact assembly which comprises a plurality of transmitting contact levers controlled by a corresponding plurality of cams on the transmitting cam drum or assembly 14, which levers are controlled sequentially by a series of cams, as disclosed in said afore-mentioned patent. The typing unit 11 comprises a platen 18 which moves in a rightward and leftward direction (as viewed in Fig. 1) with respect to a typewheel 19. Printing is effected from the typewheel pallets 21 by the print hammer 22 pivoted on the operating lever 23 which is operated by a print cam (not shown).

The selector magnet 24 controls, through the instrumentality of telegraph signals, all of the various operations of the printer apparatus through a primary selector 25, the T-levers 26 of which act to control the setting of a code disc

selector 27 (Fig. 2), and also the interponents 28 of the perforating mechanism 29.

The perforator 29 comprises a set of punches 31 movable through suitably spaced guide plates and coacting with a die plate to perforate a tape. The interponents 28 are provided with projections 32 so that when an interponent 28 is selected and moved rightwardly, as viewed in Fig. 1, the projection 32 will align with the punch 31 to cause it to perforate the tape, when the punch hammer 33 is rocked about its pivot 34. As indicated in Fig. 5 and as fully disclosed in said copending application, the punch hammer has associated with it a pawl 35 which cooperates with a tape feed ratchet 36 fixed to the shaft or feed roll 37. Pawl 35 and ratchet 36 accomplish the forward feeding movement of the tape.

The punch block 29 also carries facilities for backspacing the tape, and as disclosed in the copending application, this backspacing mechanism is also effective to impart corresponding reverse movement to the page or web simultaneously with the backspacing movement of the tape. Carried in the punch block 29 is a backspace bar 41 having at its forward end a finger piece 42. The space bar 41 is suitably provided with a spring (not shown) which normally biases the bar 41 forwardly. A plate 43 is rotatably mounted on the feed roll shaft 37 and is arranged to be pivotally articulated at 44 to the backspace bar 41. With this manner of connection, the plate 43 is rotated counterclockwise (as viewed in Fig. 5) and the backspace bar 41 is actuated rearwardly upon pressing the finger piece 42, and when the bar 41 is urged forwardly by the spring (not shown) upon release of the finger on the finger piece 42, the plate 43 will be rotated clockwise to the position shown in Fig. 5.

The plate 43 carries a pawl member 45 pivoted thereto at 46 (Fig. 5). Pawl 45 is provided with an arm 47 which is caused to bear against the side of the space bar 41 by the action of a spring 48 which continually tends to cause pawl 45 to rotate in a counterclockwise direction about pivot 46. However, in the position shown in Fig. 5, the spring 48, in tending to rotate the pawl 45 so as to cause the end 47 thereof to bear against the side of the bar 41, is prevented thereby from bringing the tooth of the pawl 45 into engagement with the teeth of the backspace ratchet 49. Now, when the space bar 41 is actuated rearwardly, the pivot 44 is correspondingly actuated rearwardly so as to rotate the plate 43 in a counterclockwise direction. In so doing, the pivot 46 is also moved counterclockwise with the plate 43 away from bar 41 so that the spring 48 is enabled to rotate the pawl 45 counterclockwise to bring the tooth of the pawl 45 into engagement with the teeth of the ratchet wheel 49. This is made possible by the fact that the pivot 46 is moved farther away from the side of the bar 41 so as to permit the pawl 45 to be rotated since the arm 47 is held constantly in engagement with the side of the bar 41 as the pivot 46 is moved with the tape 43. Then, as the bar 41 is urged farther in the rearward direction, the pawl 45 will rotate the ratchet 49 counterclockwise, thus causing the feed roll 37 to rotate correspondingly to move the tape in a reverse direction (or rightwardly, as shown in Fig. 1). However, to enable the performance of the backspace operation, it is necessary to hold the feed pawl 35 out of engagement with the main feed ratchet 36. This achieved by a cam device as shown in the copending application which acts upon rotation

of the plate 43 to cam out the pawl 45 and disengage it from the ratchet 36 while the backspacing operation is being performed.

As fully described in the copending application, the platen 18 is caused to be backspaced in accordance with the backspacing operation performed on the tape. Hence, the backspace bar 41 is pivotally connected to a lever 51 (Fig. 1) which corresponds to lever 126 of the copending application.

To achieve the object of the present invention, which is to control automatically the deleting or cancelling operation, there is pivotally articulated to the backspace bar 41 at 52 (Fig. 2) the upper end of a lever 53 which is rotatably carried on a pivot 54 appropriately supported in the printer 12. Pivoted at the lower extremity of the vertical lever 53 is a pawl 55 which normally tends to rotate in a clockwise direction by a spring 56, but which rotation is controlled by a stud or pin 57 fixed to a bracket 58 mounted on the base 13. The pawl 55 is provided with a cam surface 59 which coacts with the pin 57 to normally hold the pawl 55 out of engagement with the teeth of a rack bar 61. When the backspace bar 41 is actuated rearwardly (or rightwardly, as viewed in Fig. 2), the lever 53 will be rotated a predetermined amount clockwise about its pivot 54 thus moving the pawl 55 leftwardly. In moving in this direction, the pawl 55 through its cam surface 59 will rotate clockwise to bring the tooth thereof into engagement with a tooth on the rack 61, and the further movement of the lever 53 will cause the rack 61 to be moved leftwardly a predetermined distance commensurate with one tooth on the rack. Then, as the bar 41 is released, the lever 53 will be returned to its vertical or counterclockwise position, causing the cam surface 59 of the pawl 55 to rotate the pawl 55 counterclockwise out of engagement with the teeth on the rack bar 61.

As the rack bar 61 is thus actuated step-by-step in a leftward direction by the pawl 55, it is held in its stepped position by the tooth 62 of an escapement pawl 63 which is pivotally carried on a bracket 64 mounted on the base portion 13. The pawl 63 is normally biased in a clockwise direction by a spring 65. The operation of the escapement pawl 63 to effect the return of the rack bar 61 to its rightward position (shown in Fig. 3) under the influence of spring 66 to cause portion 67 of rack bar 61 to abut against the backstop 68 will be described hereinafter.

The rack bar 61 is provided at its left end (as viewed in Fig. 3) with a lateral projection 69 having a beveled extremity which cooperates with a T-shaped lever 71 pivotally mounted at 72 on a bracket 73 suitably supported to the base structure 13. Lever 71 is also pivotally articulated at 75 to a key lever 76 so that as the key lever 76 is depressed, counterclockwise rotation is imparted to lever 71 about pivot 72. Lever 71 is so mounted on the pivots 75 and 72 as to be free to move sidewise under the influence of a spring 77 so that when the rack bar 61 is actuated one step from the extreme rightward position shown in Fig. 3, under the influence of the pawl 55, the extremity of the portion 69 will be moved free of the lever 71 to permit the lever 71 to respond to the pull of its spring 77 so as to bring the end 78 of lever 71 into the path of the portion 79 integral with the repeat space rod 81. Then, when the key lever 76 is depressed, the lever 71 will be rotated counterclockwise and will engage the extremity 78 with the portion 79

to impart leftward movement to the repeat space rod 81 so that the reverted portion 82 of the repeat space rod 81 will cooperate with the depending arm of the clutch trip bell crank lever 83. The bell crank lever 83 is normally actuated by a link 84 connected to the universal bail (not shown) which, in turn, is normally operated by the key levers.

However, to achieve the object of the present invention, the repeat space rod 81 has been modified to respond to the operation of the rub out key lever 76 through the key lever 71, so that under certain predetermined operating conditions, as long as the key lever 76 is held depressed, the link or repeat space rod 81 will be actuated leftwardly to hold the bell crank lever 83 in its clockwise position. The bell crank lever 83 carries at the extremity of its horizontal arm an eccentric abutting screw 85 which cooperates with an arm 86 of a clutch release lever 87 rotatably carried on a shaft 88 journaled in a pair of brackets 89 and 91. The clutch release lever 87 is normally biased in a clockwise direction by a spring 92 to bring the vertical arm 93 of the lever 87 into cooperative relation with the driven portion 94 of a toothed or grab clutch carried on the transmitting cam shaft 95. As shown in Fig. 2, the driven portion 94 is a part of a toothed or grab clutch, the driving portion of which is indicated as 96.

Having reference to Figs. 2 and 3, the driven clutch portion 94 is provided with a flange 97 which is provided at 98 with a cam portion and at 99 with a stop portion. As is known with this type of clutch, the arm 93 cooperates with the side of the flange 97 so that as the clutch rotates in a clockwise direction as indicated by the arrow, the head of the arm 93 will cooperate with the cam portion 98 to slide the portion 94 leftwardly so as to disengage the portion 94 from the portion 96, after which the head 93 cooperates with the stop 99 to prevent further rotation of clutch portion 94. When the bell crank 83 is actuated clockwise, it operates upon the arm 86 to rock the clutch lever 87 counterclockwise to swing the arm 93 out of the path of the stop 99, permitting the spring 101 (Fig. 2) to effect the engagement of the clutch portion 94 with portion 96 to initiate rotation of the clutch, and, of course, the cams on the transmitting cam assembly.

Normally, the rotation of the clutch portion 94 is limited to a single revolution of 360 degrees, because of the fact that the trip lever or link 84 is, after a predetermined period of engagement, automatically disengaged from the bell crank 83 upon each depression of a key lever, whereupon the lever 87 is immediately returned to its clockwise position to bring the head 93 into the path of the stop portion 99. However, with the structure according to the present invention the repeat space rod 81 when being acted upon by the key lever 76, will hold the bell crank 83 in its clockwise position, and consequently, the clutch release lever 87 is likewise held in its counterclockwise position against the pull of the spring 92 to permit continuous rotation of the clutch portion 94 (and the transmitting cam sleeve) for a predetermined period of time, depending upon the operation of the rack bar 61, as will presently appear.

Also mounted on the shaft 88 is a lever 102 having oppositely directed arms 103 and 104 (Figs. 3 and 4). The spring 92 is extended between the clutch release lever 87 and the arm 104 of lever 102, thus tending to rotate the levers

102 and 87 toward each other. The lever arm 104 is adapted to cooperate with the stop portion 99 of the driven portion 94 but in a different manner from the cooperation between arm 93 and the stop 99. The portion 99 in this instance acts in the nature of a cam apex to cause lever 102 to be actuated in a clockwise direction each time the portion 99 cooperates with the arm 104. Thus, for each rotation of the cam portion 94, the lever 102 is rocked. The lever arm 103 of lever 102 cooperates with the rearwardly extending portion 105 of the escapement pawl 63 so that each time the lever 102 is rocked, corresponding rocking motion is imparted to the pawl 63 to bring the teeth 62 and 106 thereon alternately or in escapement manner into engagement with the teeth on the rack bar 61.

General operation

In the operation of the device according to the present invention, it is assumed that the rack bar 61 has been returned to the zero or rightward position shown in Fig. 3, with the portion 67 thereof abutting the fixed stop 68. In this position, the portion 69 is operative, through its beveled extremities to cam the lever 71 to its counterclockwise position against the tension of spring 77, thus holding head 78 of lever 71 out of cooperative relationship with portion 79 of repeat space rod 81. Also, the levers 87 and 102 assume the positions shown in Figs. 3 and 4 with the driven clutch portion 94 held against rotation. It is further assumed that a tape is being perforated in the perforating unit, exemplified by the punch block 29, and that it is desired to backspace the tape and to cancel the backspaced code combinations of perforations. To effect the backspacing of the tape, the backspace bar 41 is actuated, which, through the lever 53, operates the pawl 55, which in turn engages the rack bar 61 to move said rack bar along its slot 60, one tooth distance for each operation of the backspace bar 41. As the rack bar 61 is moved leftwardly away from the stop 68, the portion 69 also moves further away from the lever 71, thus permitting the lever 71 to respond to the pull of its spring 77 to bring the head 78 into the path of the portion 79 of the repeat space rod 81. The number of backspaced code combinations having been determined by operating the back space bar 41, the required number of times, and the tape backspaced accordingly, the rub out key 76 is operated and held depressed by the operator.

The principal feature of the present invention is to limit the number of deletions to correspond exactly with the number of backspaced code combinations regardless of the length of time the operator holds the key 76 depressed. When the key 76 is depressed, the lever 71 is actuated to strike against portion 79 to actuate the repeat space rod 81 leftwardly, which in turn causes the lever 83 to be rotated in a clockwise direction to impart counterclockwise rotation to the clutch release lever 87 which then permits the driven clutch portion 94 to engage the driving portion 96 to effect continuous rotation of the clutch and associated cams. Hence, the continued rotation of portion 94 permits the portion 99 thereon to strike the arm 104 of lever 102 once for each revolution of the clutch to cause the rocking of the lever 102, which in turn through arm 103 causes the escapement pawl 63 to rock in escapement manner, bringing the teeth 62 and 106 alternately into the path of the teeth on the rack bar 61, which rack bar 61 is actuated or moved step-

by-step in a rightward direction by the spring 66 until the stop 68 is struck by the portion 67. Simultaneously with the abutment of the portion 67 against the stop 68, the portion 69 of rack bar 61, through its beveled extremity, cams the lever 71 in a counterclockwise direction against the action of spring 77 so as to disengage the extremity 78 from the portion 79 of the repeat space rod 81, thereby permitting the repeat space rod 81 to respond to its rightward bias by a spring (not shown) to withdraw the end 82 from the depending arm of bell crank 83. Thus the bell crank 83 no longer holds the clutch release lever 87, which is permitted to respond to the pull of its spring 92 to bring the head 93 into the path of the stop portion 99, thereby stopping the rotation of the clutch mechanism. It is seen that the stopping of the clutch in this manner is effected even though the operator holds the key lever 76 depressed; and only a definite number of steps or step-by-step actuations are imparted to the rack bar 61, commensurate with the number of backspaced characters or code combinations.

Because numerous changes and modifications may be made without detracting from the spirit or scope of the present invention, it is intended not to limit the invention to the specific language of the foregoing description or to the details of the accompanying drawings, but to be permitted, instead, a latitude of construction as indicated by the hereunto appended claims.

What is claimed is:

1. In a recorder, printing instrumentalities comprising platen means and typing means, pawl and ratchet mechanism for effecting relative movement between said platen means and said typing means, perforating means, strip moving means in said perforating means, signal controlled means for causing a predetermined similar response in said mechanism and said strip moving means, escapement mechanism for reversing the movement between said platen means and said typing means, backspacing mechanism for said strip moving means, means effective to control the operations of said escapement mechanism and said backspacing mechanism simultaneously, perforating instrumentalities, and means effective under certain conditions of operation for automatically controlling the operations of said perforating instrumentalities whereby the operations of said perforating instrumentalities are commensurate with the operations of said escapement mechanism and said backspacing mechanism.

2. In combination, a signal determining means, a first means for operating said signal determining means in one manner, a second means for operating said signal determining means in a reverse manner, and self-limiting means effective following the operation of said second means for automatically operating said signal determining means in the first manner commensurate with the prior operation of said second means.

3. In combination, signal determining means, a first means for operating said signal determining means in one manner, a second means for operating said signal determining means in a reverse manner, a controlling device, means effective in response to the operation of said second means for conditioning said controlling device according to said operation of said second means, initiating means, and means effective in response to the operation of said initiating means to control, following the operation of said second means, the operation of said first means an extent commensurate with the prior operation of said second means as determined by said controlling device.

4. In combination, strip actuating means, a first means for operating said actuating means in one manner, a second means for operating said actuating means in a reverse manner, a controlling device, means effective in response to the operation of said second means for conditioning said controlling device according to said operation of said second means, initiating means, and means effective in response to the operation of said initiating means to control, following the operation of said second means, the operation of said first means an extent commensurate with the prior operation of said second means as determined by said controlling device.

5. In combination, a tape feeding means, a first means for operating said feeding means in one manner, a second means for operating said feeding means in a reverse manner, control means comprising a stepping pawl and rack bar for governing the operation of said feeding means, means effective in response to the operation of said second means for operating said stepping pawl to condition said rack bar according to the operation of said second means, escapement means for controlling the release of said rack bar, initiating means, and means effective in response to the operation of said initiating means to control through said escapement means the release of said rack bar to govern the operation of said first means an extent commensurate with the prior operation of said second means as determined by said control means.

6. In combination, a tape feeding means, a first means for operating said feeding means in one manner, a second means for operating said feeding means in a reverse manner, control means comprising a stepping pawl and rack bar for governing the operation of said feeding means, means effective in response to the operation of said second means for operating said stepping pawl to condition said rack bar according to the operation of said second means, escapement means for controlling the release of said rack bar, cyclically operable means, initiating means, and means effective in response to the operation of said initiating means to control, through said cyclically operable means, said escapement means to release said rack bar whereby the operation of said first means is limited to an extent commensurate with the prior operation of said second means as determined by said control means.

7. In combination, a strip perforating means, a first strip feeding device effective in one manner, a second strip feeding device effective in a reverse manner, a device adapted to be actuated by said second device according to the number of operations of said second device, and means effective under the control of said actuated device to reoperate said first device a number of times commensurate with the prior operation of said second device.

8. In combination, a strip perforating means, a first strip feeding means for operating said perforating means in one manner, a second strip feeding means for operating said perforating means in a reverse manner, and measuring means effective following the operation of said second means for controlling the automatic operation of said perforating means in the first manner a number of times commensurate with the prior operation of said second means.

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