

July 24, 1956

R. G. WAMPACH

2,756,273

TAPE FEED ARRESTOR

Filed Nov. 5, 1952

FIG. 1

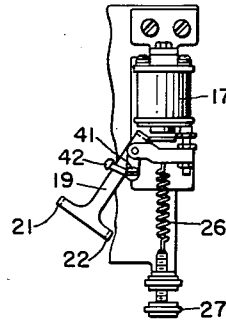
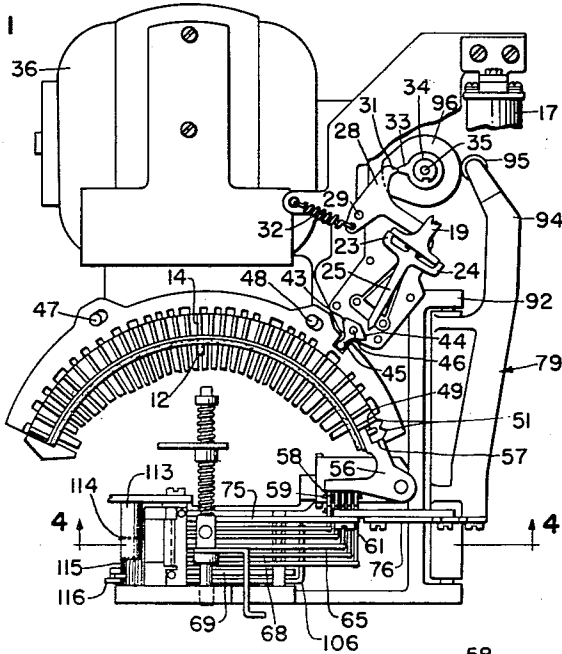


FIG. 2

FIG. 3

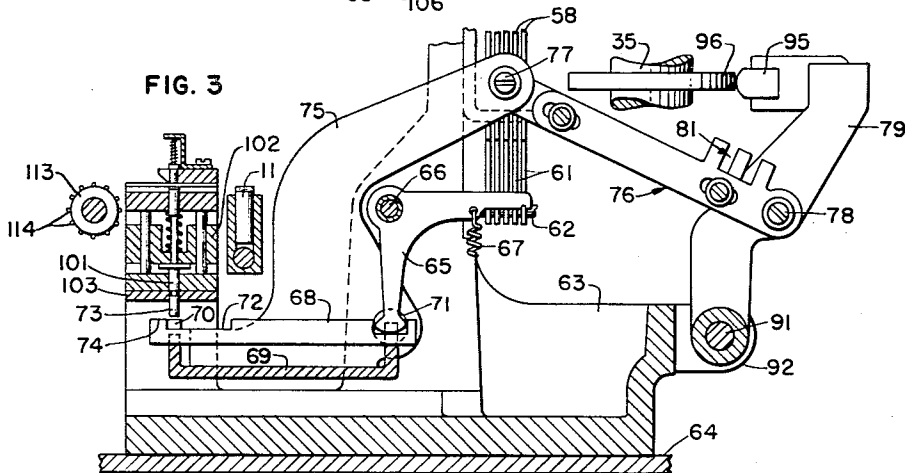
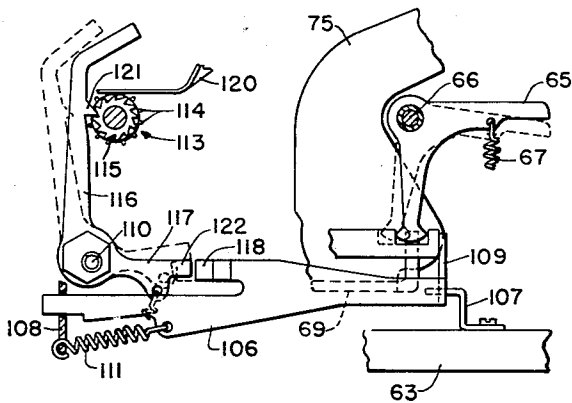


FIG. 4



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2,756,273

TAPE FEED ARRESTOR

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Application November 5, 1952, Serial No. 318,842

1 Claim. (Cl. 178—92)

This invention relates to telegraph apparatus and more particularly to improvements in reperforating apparatus.

The principal object of the present invention is to provide in a tape reperforator a tape arresting means for automatically halting the stepping of the tape in response to predetermined signaling conditions.

Another object of the invention is to provide a blank deleter for preventing the stepping of the tape in a tape reperforator in response to blank signal code combinations.

More specifically, the present invention contemplates the provision of a mechanism which disengages the tape feed pawl on a telegraph printing apparatus of the type disclosed in U. S. Patent No. 2,273,909, issued February 24, 1924, to C. W. Swan, upon reception of a "blank" code combination to prevent tape feeding.

While, however, the mechanism according to the present invention is intended to function in response to "blank" code signals, it nevertheless also prevents tape feeding on a "break" signal (such as when the signal line opens) or by coding the blank sensing bail it could also respond to other characters.

A feature of the present invention resides in including in a reperforator of the type disclosed in said patent, instrumentalities associated with the punch interponents of the reperforator for disabling the tape feed pawl, whereby the stepping of the tape is halted without arresting the operating cam.

A more complete understanding of the foregoing objects and features of the invention may be had from the following description when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a plan view of the apparatus embodying the present invention;

Fig. 2 is a view of the selector magnet partially deleted from Fig. 1;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1; and

Fig. 4 is a sectional view similar to Fig. 3 showing the tape arresting device according to the present invention.

Since the disclosure herein set forth is in the nature of an improvement of the printing telegraph receiver disclosed in U. S. Patent Nos. 1,745,633 and 2,273,909 or similar printer mechanisms operative to properly select the various type elements, move the tape forward, move and reverse the inking ribbon (as on a standard typewriter), shift the platen for figure case characters, and produce on a single recording medium substantially simultaneously, a printed record and code combinations of perforations representing a printed record, only so much of the mechanism of the patent will be herein-after set forth as is necessary to an understanding of the present invention. Reference may be had to said patents for a full understanding of the printer mechanisms not described hereinafter in detail.

As disclosed in the above-mentioned patents, the type bars 12 are positioned to the rear of the platen 11 and are arranged for striking forwardly and downwardly.

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Just to the rear of the type bars 12 is a series of notched code bars 16 which in the present instance are substantially semicircular in shape. Actuating bars 14 for operating the type bars 12 are located immediately in front of the code bars 16, and are adapted to be pulled one at a time into the alignment of notches in the code bars 16 when the notches are selectively aligned for a particular character or function. As indicated in Patent No. 1,745,633, the actuating bars 14 are articulated to the type bars 12 through a gear and rack means. The selecting mechanism for selectively operating the code bars 16 is of the sword-and-T-type, fully disclosed in said patent. Briefly, this selector mechanism comprises a selecting or receiving electromagnet 17 (Figs. 1 and 2), the armature lever 18 of which comprises a selecting arm 19 having abutments 21 and 22, which cooperate with abutments 23 and 24 of a series of swords 25. The armature 18 is responsive under certain conditions to the energization of the magnet 17 (for example, upon receipt of marking or current impulses) and under other conditions to the pull of a spring 26 (for example, upon the receipt of no current or spacing impulses), the tension of spring 26 being adjustable by means of screw 27. The swords 25, of which there is a plurality corresponding in number to the series of code bars 16, are brought into operative engagement with the selector arm 19 by their individual operating levers 28 pivoted on a common pivot 29. Swords 25 are pivotally articulated by a socket connection to their individual levers 28. Each of the levers 28 is provided with an arm 31 and is normally biased in a clockwise direction about the pivot 29 by a spring 32. Arms 31 cooperate with a series of helically arranged projections 33 on a selector cam drum 34, which is frictionally driven by a main operating shaft 35 located in a perpendicular position at the rear and to the right of the code bars 16. The main operating shaft 35 is driven continuously by a motor 36 through a pinion 37, secured to the motor shaft 38, which pinion meshes with a gear (not shown) operatively associated with shaft 35.

As fully described in Patent No. 1,745,633, the cam drum 34 is initiated into rotation upon receipt of a starting (spacing) impulse which causes the de-energization of the magnet 17, thereby releasing the armature lever 18 which then responds to the pull of spring 26 to rotate the lever 18 in a clockwise direction. Upon this movement, an eccentric screw 41 (Fig. 2) cooperates with a plunger 42 which acts in the manner shown in Fig. 5 of U. S. Patent No. 1,884,743 to release, through a lever arrangement, a stop arm (not shown) to initiate rotation of cam 34.

The speed of rotation of selector cam drum 34 is synchronized with the speed of code impulsing so that as the armature lever 18 is operated in response to received impulses, a cam 33 acts upon its associated lever 28 to rock it counterclockwise (as viewed in Fig. 1) to bring its sword 25 against selector arm 19. Sword 25 will be swung clockwise or counterclockwise, depending on whether abutments 21 and 23 or 22 and 24 cooperate; for example, if abutments 21 and 23 cooperate, then the sword 25 will be swung in a counterclockwise direction and will assume the position shown in Fig. 1. On the other hand, if abutments 22 and 24 cooperate, then sword 25 will be swung in a clockwise direction to assume the opposite position. After the sword 25 has been set in accordance with the nature of the signal impulse and the cam 33 passes out of operative engagement with arm 31, the lever 28 will be actuated in a clockwise direction by its spring 32, carrying its associated sword 25 along with it to impinge the sword 25 against arm 43 or 44 of a T-lever 45 pivoted at 46, thus rocking the T-lever 45 in a clockwise or counterclockwise direction.

Each of the T-levers 45 is pivotally articulated to a code bar 16 so that when a T-lever 45 is actuated in a clockwise or counterclockwise direction, its associated code bar is actuated leftwardly or rightwardly, respectively, on studs 47 and 48. Accordingly, with the selecting mechanism just described, the code bars 16 are set selectively in their rightward or leftward positions in response to the impulses of a code signal.

As described in Patent No. 1,745,633, the setting of the code bars 16 is maintained during the printing operation by a detent or locking means. Accordingly, a locking bar 49 is provided which cooperates with beveled notches 51 on code bars 16. Bar 49 is pivotally mounted and is moved into and out of engagement with the code bars 16 as the striker bar or operating bail (comparable to bail 52 of Patent No. 2,273,909) is raised and lowered. Said operating bail is operated by a cam (not shown) on the main shaft 35, in a manner described in Patent No. 1,745,633. When said operating bail is in its lowermost position, it cooperates with beveled edges on the bars 14 and 49 to hold such bars out of engagement with the code bars 16 so that the code bars 16 may be readily shifted in accordance with the operation of the selector mechanism. When said operating bail is operated upwardly to perform a printing operation (in the manner described in Patent No. 1,745,633) the bars 14 and 49 due to said beveled edges, are permitted gradually to be actuated toward the code bars 16 by their individual springs (not shown). The actuating bars 14 are provided with a hook portion which cooperates with said operating bail, which in its upward movement engages said hook portion to lift the actuation bar 14, which through the rack and pinion engagement with the type bar cause the type bar to rotate about its pivot to bring the type face downwardly and forwardly to impinge upon the platen 11. The locking bar 49 is not provided with a hook portion, because its function is merely to rock on its pivot toward and away from the code bars 16 under the control of said operating bail to lock the code bars 16 in their set or selected position during the printing operation.

According to the present invention, the locking bar 49, while held in its position away from the code bars 16 when the operating bail is in its lowermost position, cooperates with a series of bell cranks 56 (Fig. 1) to hold said bell cranks in counterclockwise position. Bell cranks 56 are provided with shouldered portions 57 through the instrumentality of which the bell cranks 56 are permitted or prevented by code bars 16 from rotating to their clockwise position. That is, if any one of the code bars 16 is set in the position indicated in Fig. 1, and the locking bar 49 is permitted to enter the V-notch, the bell crank 56 associated therewith is blocked through the impingement of shoulder 57 upon the end of the associated code bar 16. On the other hand, if a code bar 16 assumes its leftward position, the bell crank 56 associated therewith would not be blocked, but would rotate clockwise in response to spring tension hereinafter indicated and follow the movement of the locking bar 49. As viewed in Fig. 1 it is observed that there is provided a bell crank 56 for each of the code bars 16.

Cooperating with each of the bell cranks 56 is a vertical lever 58 pivoted on a common stud 59. The upper end of each of the levers 58 cooperates with an arm of its associated bell crank 56. The lower ends of levers 58 cooperate with a corresponding series of bell cranks 61 pivotally carried on a common shaft 62. Levers 58 and 61 are pivotally mounted on a bracket 63 secured to base plate 64. The series of bell cranks 61 cooperates with a corresponding series of bell crank levers 65, pivotally supported on a pivot stud 66 secured to the bracket 63. The bell crank levers 65 are normally urged in a clockwise direction by individual springs 67. The springs 67 associated with the bell crank levers 65 also serve to impart, through their cooperative relationship, rotational movement to levers 61, 58 and 56. The depending arms

of bell crank levers 65 are provided with enlarged portions which fit into corresponding notches in a series of interponents 68 (Fig. 3), whereby the bell crank levers 65 are pivotally articulated to the interponents 68. Interponents 68 are slidably arranged in a cradle 69 pivoted at 71 to the bracket 63; and are provided near the left-hand upper edge with a cut-away portion 72 adapted to clear associated punches 73 when said interponents are in a certain operative position. Interponents 68 terminate at the left ends thereof with an enlarged portion 74 whereby they are adapted to cooperate with the punches 73 when the interponents 68 are operated to their rightward position, as viewed in Fig. 3. Cradle 69 is provided with a projection 70 adapted to cooperate with a feed hole punch (not shown) to invariably perforate a tape feed hole in the tape for each operation of the perforating mechanism. When the bell crank levers 56 are held in their counterclockwise position shown in Fig. 1, the interponents 68 assume their rightward or marking position. Conversely, when the bell crank levers 56 assume their clockwise position, interponents 68 assume their leftward or spacing position, as shown in Fig. 3.

Cradle 69 is provided with an arm 75 projecting upwardly, to the extremity of which is pivotally connected an extensible link indicated generally as 76; one end of link 76 being pivoted at 77 to arm 75 and the other end of link 76 being pivotally connected at 78 to a perforator operating lever 79. Link 76 is rendered adjustable by means of adjusting facilities 81, as described in Patent No. 2,273,909.

The operating lever 79 is pivotally mounted on a pivot rod 91 supported in arms 92 and 93 of bracket 63. As viewed in Fig. 1, the operating lever 79 is provided with an extension 94, at the extremity of which is mounted a cam follower roller 95 which cooperates with the operating cam 96 carried on the main operating shaft 35. A spring 90 acts upon lever 79 to hold cam roller 95 against the periphery of cam 96.

Supported in the bracket 63 is a punch block indicated generally as 97 in which is carried a series of punch elements 73. Each of the punches 73 is provided with an enlarged section 101, the upper edge of which cooperates with a stripper member 102 and the lower edge of which cooperates with a back stop 103. Stripper member 102 is urged downwardly by springs 104, to thereby hold the punches 73 in their lower positions free of the die plate 105.

Having reference to Fig. 4, there is shown the arrangement according to the present invention, whereby the tape feeding device is disabled in response to a blank code signal, or other predetermined code signal. Cooperably associated with the interponents 68 is a slidable bail member 106 guided at its right end by a bracket 107 and at its left end by a guide plate 108. Member 106 is provided with a bail portion 109 adapted to bear against the right ends of the interponents 68 under the influence of a spring 111 distended between the bail member 106 and the guide plate 108.

The tape, after being perforated, passes over a tape feed roller 113 (Fig. 1) which is provided with a series of spaced feed pins or projections 114 adapted to cooperate with feed holes formed in the tape by the feed punch and die plate. The feed roll 113 is provided with a series of toothed grooves 115 which cooperate with a tape feed pawl 116 carried pivotally on a pivot rod 110 in the cradle 69 in well known manner. Fixed to the shaft to which the feed roller 113 is secured is a star wheel (not shown) which co-acts with a spring loaded detent (not shown) which urges the detent roller into engagement with the star wheel in known manner. Feed pawl 116 according to the present invention is provided with an arm 117, the free end of which is related cooperably with a projection 118 formed in the slide member 106. Feed pawl 116 is normally biased clockwise by a spring 119.

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It is observed that, during the reception of line signals, one or more interponents 68 remain in the marking or rightward position, thereby maintaining the bail 106 in its right-hand position with the blocking projection 118 out of the path of rotation of arm 117 of the feed pawl 116, thus allowing the tooth 121 of the feed pawl 116 to engage a tooth 115 on the feed roll 113, to space the tape normally. In response to a "blank" signal, which is an all-spacing condition, all of the interponents assume their spacing or left-hand positions. When this occurs, the bail member 106 follows this leftward movement due to the pull of its spring 111, causing the projection 118 initially to bear against the end of the arm 117 of pawl 116. On its upstroke, the feed pawl arm 117 rises above the top of the projection 118, thus permitting the spring 111 to move the slidable bail member 106 leftwardly to bring the projection 118 underneath the shoulder 122 of arm 117 of pawl 116. When the feed pawl 116 moves downwardly, the extension or arm 117 bears on the top of the projection 118 of bail 106, and causes the pawl 116 to pivot counterclockwise about the pivot rod 110 to swing the pawl 116 to pivot counterclockwise about the pivot rod 110 to swing the pawl tooth 121 away from the ratchet teeth 115 and thus no spacing or stepping movement occurs. Toward the end of the downward movement of said pawl 116, the interponents 68 are returned to the "marking" or rightward position, and thus the projection 118 of bail 106 is pulled out from beneath the extension or arm 117, but by this time the preclusion of engagement of tooth 121 with ratchet teeth 115 has occurred.

General operation

In the operation of the apparatus according to the invention, the motor 36 is considered to be running continuously, and thus rotates the main operating shaft 35. Carried on the main operating shaft 35 are sleeve members rotatably associated therewith through clutch instrumentalities as disclosed in Patent No. 1,745,633, which sleeves are normally held against rotation. The selector magnet 17 is normally energized so that upon the receipt of a start impulse of spacing nature, the magnet 17 is de-energized and its armature lever 18 is released under the tension of spring 26 whereby the stud 41 thereon urges the plunger 42 leftwardly to release through a series of levers (not shown) the sleeve members on the shaft 45 for rotation in timed relation to each other. As indicated in the Patent No. 1,745,633, the cam drum selector 34 is released for rotation so that the cam projections 33 thereon operate levers 28 in such a manner that through the cooperation of selector arm 19 therewith the swords 25 are caused to abut said arm 19 and are actuated to one or the other of their selective positions. The operative relationship of the abutments on the swords 25 and selector lever 19 are determinative of the positions of said swords to operate the T-levers 45 to one or the other of their operative positions, the T-levers in turn actuating the code bars 16 to their rightward or leftward position in accordance with the received code combination.

In timed relation with the rotation of cam drum 34, the sleeve carrying the cam (not shown) for performing the several functions of the printer and the operating cam 96 is initiated into rotation. The cam (not shown) operates the afore-mentioned striker bar or operating bail, which through a selected pull bar 14 causes a typebar 12 to effect printing. Simultaneously with the actuation of the typebar for printing a character, the locking bar 49 responds to the pull of its spring so that the upper edge of said locking bar moves into the V-shaped notches 51 in the code bars 16. In so doing, the levers 56 are permitted to follow this movement of the locking bar 49 in response to the action of their respective springs 67 (Fig. 3). However, when any of the code bars 16 is in its rightward position, the shoulder 57 of

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lever 56 will strike against said code bar and the corresponding bell crank lever 56 will be blocked against movement. Therefore, the levers 58, bell crank levers 61 and 65, and interponents 68 associated therewith will have no motion or movement imparted thereto and will assume the position opposite to that shown in Fig. 3; that is, with the portion 74 of interponent 68 in register with the punch 73. However, when any one of the code bars 16 is in its leftward position, the shoulder 57 of lever 56 will not be blocked by its associated code bar 16 and will be permitted to rotate in a clockwise direction under the action of spring 67 through the interconnected levers 65, 61 and 58. This movement will cause the interponent 68 (Fig. 3) associated therewith to be actuated leftwardly to bring the portion 74 of the interponent 68 out of register or alignment with the punch 73. In proper timed relation with these operations, the cam 96 for operating the perforator will actuate the perforating lever 79 clockwise, as viewed in Fig. 3, so that, through the link 76, the cradle 69 will be rocked clockwise to bring all of the interponents 68, which have not been moved leftwardly, into engagement with their respective punches 73, thus urging said punches upwardly through the tape. As the cradle 69 is permitted to rock backward to its counterclockwise position, the feed pawl 116 which is carried thereby functions to pick up a tooth on the ratchet portion 115 of feed roll 113 to feed or step the tape 120 one step.

As previously indicated, while the interponents 68 are being positioned or set selectively, the bail 106 is normally tending to move leftwardly due to the pull of its spring 111, but cannot so move, as long as any one or more of the interponents 68 is in its "marking" or rightward position. Consequently, the tape feed pawl 116 is not blocked by the projection 118 and tape feeding is not interfered with. However, whenever an all-spacing condition occurs, as the result of a "blank" code signal or a break in the line, all of the interponents 68 are moved to their leftward position, and the bail 106 is free to respond to the pull of its spring 111 to cause the projection 118 thereof to interfere with the normal tape feeding operation, as previously described, whereby the stepping of the tape 120 is prevented. It is to be observed that according to a salient feature of the present invention the halting of the tape is effected without stopping the cyclic rotation of cam 96. That is, cam 96 rotates invariably during each signal cycle, but the tape stepping is halted by means extraneous to the operation of cam 96; namely, the bail 106.

It is to be understood that the above-described arrangement is merely illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

In combination, recording mechanism comprising a selecting mechanism, signal responsive means for controlling said selecting mechanism, record producing means, interponents effective under the control of said selecting mechanism for controlling said record producing means, record strip moving means including a reciprocating pawl member and a cooperating ratchet means, said reciprocating pawl member having a laterally directed portion, a reciprocable bail member constantly bearing directly against the ends of said interponents, a blocking projection carried on said bail member and subjacent to positionable with respect to said laterally directed portion, said bail member effective during all but one permutative setting of said interponents to hold said blocking projection in nonblocking relation with respect to said laterally directed portion, and means to render said bail member effective in response to said one setting of said interponents to move said blocking projection into blocking relation with said laterally di-

rected portion, whereby due to the subjacent position-
ment of said blocking projection with respect to said
laterally directed portion said pawl member is rotated
during each reciprocation thereof out of operative en-
gagement with said ratchet means to render said record 5
moving means ineffective to move the record strip.

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