

April 5, 1960

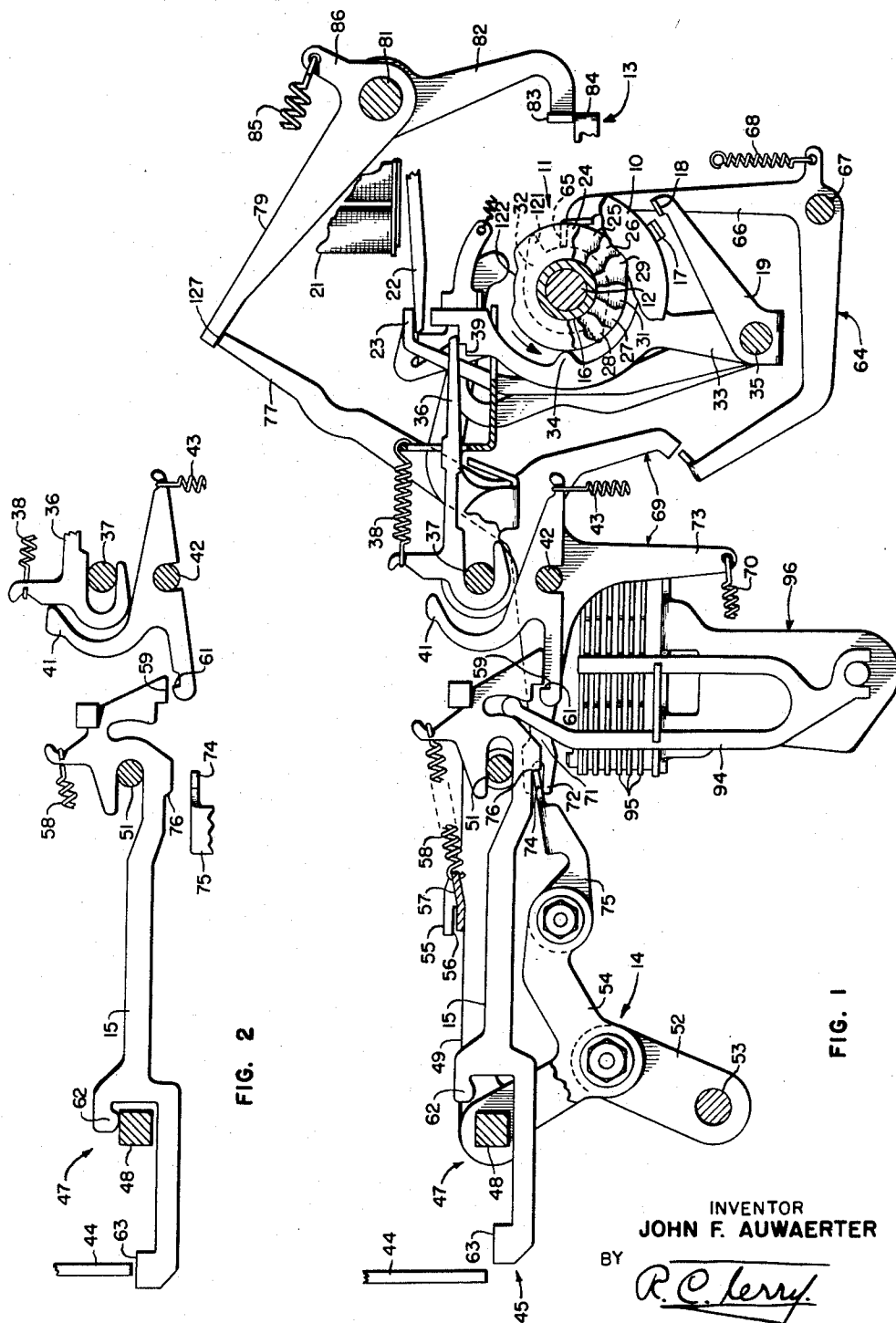
J. F. AUWAERTER

2,931,861

PERFORATOR

Filed Nov. 21, 1958

3 Sheets-Sheet 1



April 5, 1960

J. F. AUWAERTER

2,931,861

PERFORATOR

Filed Nov. 21, 1958

3 Sheets-Sheet 2

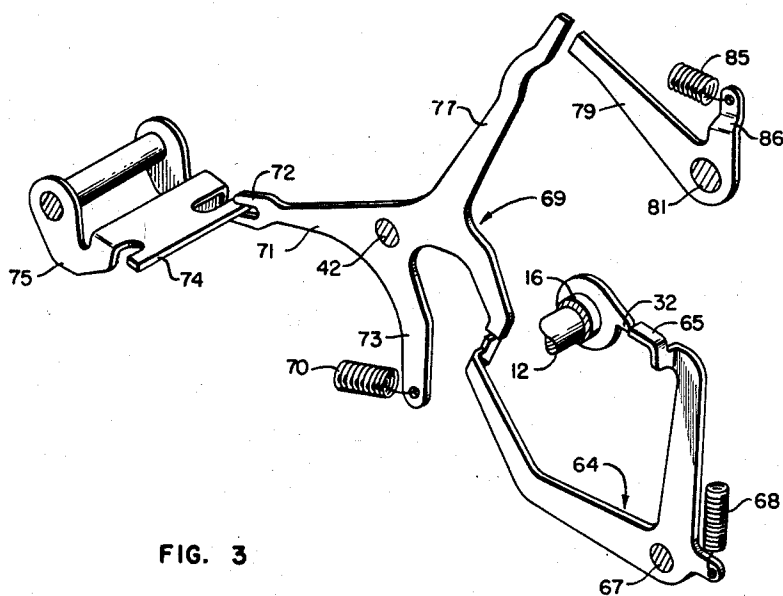


FIG. 3

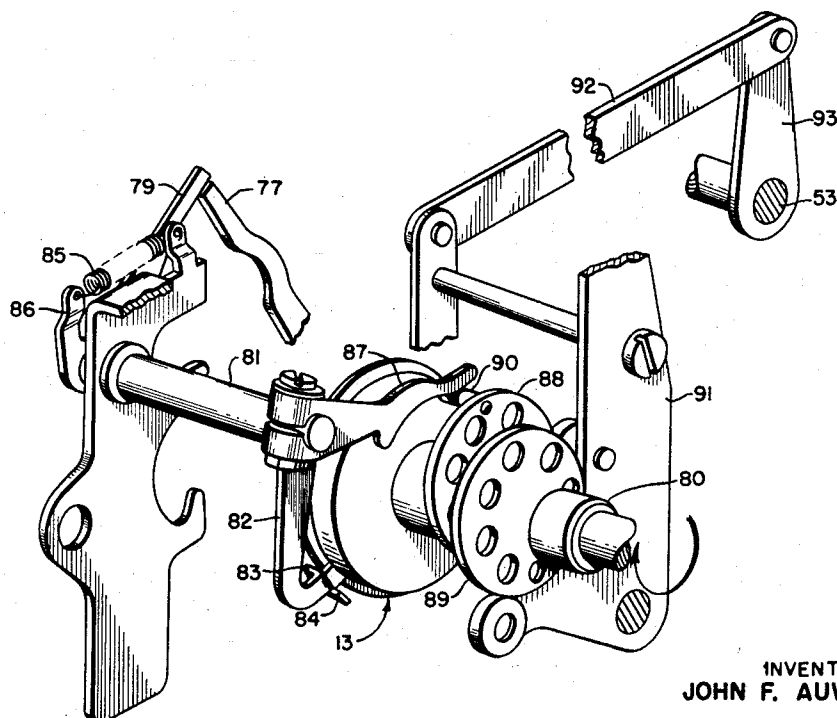


FIG. 4

INVENTOR
JOHN F. AUWAERTER

BY

R. C. Perry
ATTORNEY

April 5, 1960

J. F. AUWAERTER
PERFORATOR

2,931,861

Filed Nov. 21, 1958

3 Sheets-Sheet 3

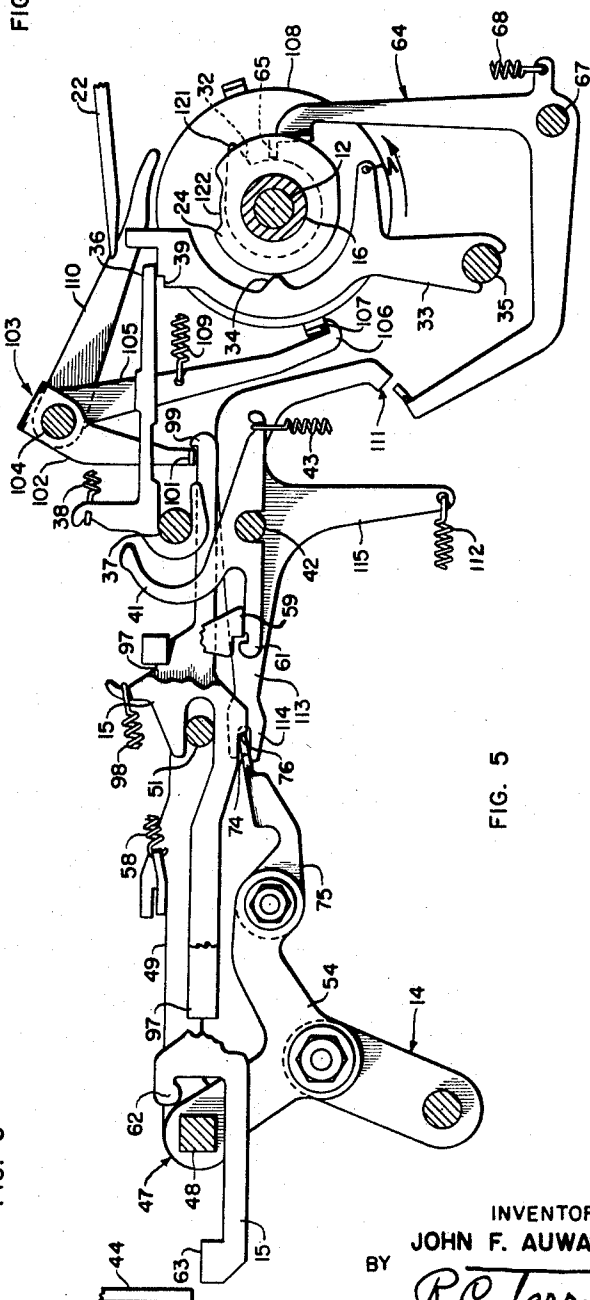
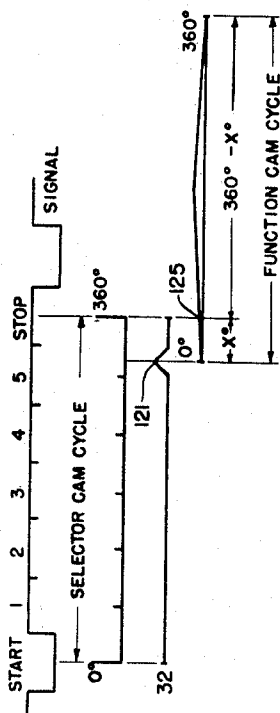
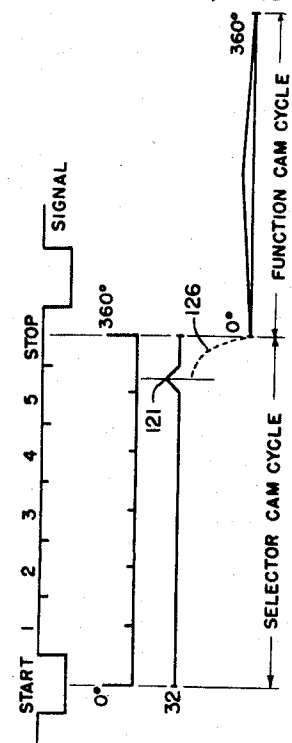


FIG. 5

INVENTOR
JOHN F. AUWAERTER
BY *R. C. Terry*
ATTORNEY

1

2,931,861

PERFORATOR

John F. Auwaerter, Evanston, Ill., assignor to Teletype Corporation, Chicago, Ill., a corporation of Delaware

Application November 21, 1958, Serial No. 775,462

6 Claims. (Cl. 178—92)

This invention relates to perforators and more particularly to clutch trip mechanisms therefor.

The primary object of the invention is to provide a time delay arrangement for clutch trip mechanisms to achieve more efficient use of rotary elements driven through the clutch.

More specifically, to insure more effective use of function operating cams in signal responsive apparatus (for example, telegraphically controlled perforators), the device according to the present invention has been devised to overcome the delay inherent in clutch trip mechanisms heretofore employed, wherein the clutch tripping cam of the selector cam assembly acts directly upon a clutch tripper to positively trip or release the function clutch before the entire code combination of signal impulses has been fully received by the selector, with the result that the entire function cycle is not available for effective use.

With the clutch trip system according to the present invention, the tripping of the punch operating clutch is delayed so as to occur at the end of the fifth pulse interval, thus utilizing maximum time to effectuate a selection operation, as well as utilizing the full revolution of the punch operating cam to effect the punch operation, in which event, the entire function cycle is available for effective use.

A more complete understanding of the present invention may be had from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a fragmentary longitudinal, vertical view of a perforator embodying the clutch trip mechanism according to the present invention;

Fig. 2 is a fragmentary view of a portion of the apparatus shown in Fig. 1, illustrating the position of some of the elements when a punch interponent is selected for operation;

Fig. 3 is a front perspective representation of the clutch trip mechanism according to the invention;

Fig. 4 is a rear perspective representation of the trip mechanism for the punch operating clutch;

Fig. 5 is a fragmentary sectional view of a modified form of the invention, and

Figs. 6 and 7 are comparative timing charts of previously known devices and the ones embodying applicant's invention, respectively, illustrating advantages achieved by the present invention.

The present invention in its preferred embodiment, has been adapted to the perforating apparatus of the printing telegraph reperforator disclosed in copending application, Serial No. 725,935, filed April 2, 1958, by R. E. Arko and C. W. Swan. Accordingly, in the drawings, only so much of the apparatus of said copending application is shown as is necessary to the disclosure of the present invention.

The basic design of the selector mechanism 11 is shown and claimed in the patent to W. J. Zenner, No. 2,595,745, issued May 6, 1952, to which reference may be had for details of operation and structure of the se-

2

lector. The selector mechanism 11 receives its motive power from a main power shaft 12 which is continuously driven by a motor (not shown). There are two similar clutch mechanisms 10 and 13 associated with the main power shaft 12 and one of these clutches indicated 10 in Fig. 1, is operable to connect the selector mechanism 11 to the main power shaft 12. The other clutch, which may be termed either the main power clutch or the function clutch, is designated by the numeral 13 (Figs. 1 and 4) and serves to supply power for operating the toggle mechanism 14 (Fig. 1) of the perforator following the selection of the punch selector slides 15. Both of these clutch mechanisms are of the type shown and claimed in the patent to A. N. Nilson et al., No. 2,568,249, issued September 18, 1951. The punch mechanism shown in Fig. 1 is basically the same as the punch mechanism shown and claimed in the patent to W. J. Zenner, No. 2,490,608, issued December 6, 1949.

Mounted on the front end of the main power shaft 12 (Fig. 1) is the clutch 10 which serves to transmit power from the shaft 12 to a selector cam sleeve 16 on which a plurality of cams are mounted. Said clutch, as pointed out hereinbefore, is of the type disclosed in detail in the patent to A. Nilson et al., No. 2,568,249, and is rendered effective to connect the selector cam sleeve 16 to the shaft 12 when a stop projection 17 of a clutch shoe lever such as disclosed in the Nilson et al. patent is released by an end portion 18 of a stop bail 19.

The selector mechanism 11 includes a selector magnet 21, which upon receipt of a marking or current impulse will attract an armature 22, and upon receipt of a spacing or no current impulse will release armature 22. At the start of a signal for any character or function, the start interval, which is of no current or spacing nature, releases the selector armature 22 which then moves away from the selector magnet 21 to unlatch the start lever 23, to permit lever 23 to move clockwise, which motion is imparted to bail 19, in a manner described in said Patent No. 2,595,745, to release the clutch 10 for rotation, and hence, also the selector cam sleeve 16.

In addition to the start cam, the selector cam sleeve 16 has on it, five selector cams 24, 25, 26, 27 and 28, a spacing lock-lever cam 29, a marking lock-lever cam 31, and a function clutch cam 32. The selector cams just described are substantially the same as the cam described in detail in said Patent No. 2,595,745, and have associated therewith various cam levers 33 which are spring urged to engage their cam follower portions 34 with the peripheries of their respective cams. Any one of the selector cam levers 33 which is permitted to rock clockwise about the shaft 35, due to a marking condition prevailing at the proper time interval when the indentation in its respective cam 24 to 28 is aligned with its cam follower projection 34, will permit a push lever 36 which is slidably and pivotally mounted on the stationary shaft 37 to rock clockwise under the influence of its actuator spring 38, to cause its free extremity to drop down onto the lower push-bar-engaging-shoulder 39 of the selector lever 33. When a push lever 36 is on the lower shoulder 39 of one of the selector levers, the push lever 36 will be moved to the left with respect to its pivot shaft 37 as the selector lever 33 is rocked counterclockwise due to the cam follower projection on it engaging the cam follower portion 34 of its respective selector cam.

When a push lever 36 is moved to the left, it will engage a selector slide latch 41 individual to it and will rock said latch 41 about a pivot shaft 42 against the action of a contractile spring 43. There is one slide latch 41 for each of the push levers 36. Consequently, when a push lever 36 is selected and actuated by its associated selector lever 33, a selector slide latch 41 will be rocked counterclockwise about the pivot shaft 42.

3

The spring 43 normally holds the selector slide latch 41 in latching engagement with a punch selector slide 15. There are five of the punch selector slides 15 provided in the apparatus, one being associated with each of the selector slide latches 41, and there is one selector slide latch 41 associated with each one of the five selector levers 33.

The selector mechanism 11 serves to select for operation, various mechanisms in the apparatus including punches 44 in the punch mechanism 45, which, as mentioned hereinbefore, is basically the same as disclosed in Patent No. 2,490,608. The punch actuator bail 47 comprises a cross bar 48 which is rectangular in cross section and is fixed to a pair of arms 49 pivoted on a shaft 51. The punch actuator bail 47 is oscillatable about the shaft 51 by means of the toggle mechanism 14, which comprises a pair of bell crank levers 52 fixed to a rockable shaft 53, and a second pair of bell cranks 54 pivoted on the bell cranks 52 and also pivotally attached to the cross bar 48 of the punch actuator bail 47.

Each of the arms 49 of the punch actuator bail 47 is provided with a projection 55 in which there is formed a slot 56 to receive a cross bar 57 carried in the bail 47. The cross bar 57 serves as an anchor for a plurality of contractile springs 58, and one contractile spring 58 being provided for each of the punch selector slides 15 which are slidable on and pivotable about the shaft 51 and which are urged by their respective springs 58 to move to the left (Fig. 1). Each of the selector slides 15 has a latching portion 59 formed on it which co-operates with a latching shoulder 61 formed on its associated selector slide latch 41 so that when the selector slide latch 41 is in the position shown in Fig. 1, the latching portion 59 of the punch selector slide 15 will be positioned in latching relation with the latching portion 61 and will prevent an unselected selector slide 15 from moving to the left. However, when the selector slide latch 41 is rocked to the position shown in Fig. 2 by the associated push lever 36, as will presently appear, the latching shoulder 61 will be moved out of the path of the latching portion 59 and the spring 58 will move the punch selector slide 15 to the left, to the position shown in Fig. 2 (when permitted to do so by member 75 as will presently appear), where a shoulder 62 on said slide 15 will extend over the top of the cross bar 48.

When the punch actuator bail 47 is moved upwardly, due to the rocking of the bell crank lever 52, in a manner hereinafter described, in a counterclockwise direction (as viewed in Fig. 1) about the axis of the shaft 53, any of the punch selector slides 15, which have been selected and released by their associated selector slide latches 41, will be moved upwardly. In moving from the position shown in Fig. 1 to the position shown in Fig. 2, a punch selector slide 15 will carry a head portion 63 on it, into position beneath its associated punch 44 which, of course, is carried in a punch block, as is well known in the art.

The manner of initiating the movement of the selector slides 15 from the position shown in Fig. 1 to that shown in Fig. 2 will now be described. The function clutch cam 32 has associated with it a function clutch cam lever 64, which has a cam follower portion 65 on the vertically extending arm 66 thereof and is urged to rotate in a counterclockwise direction about a stud shaft 67 by a contractile spring 68. When the high portion of the function clutch cam 32 comes into engagement with the cam follower portion 65, the lever 64 will be rocked clockwise about the stud shaft 67 to rock a four-armed lever 69 in a counterclockwise direction about the pivot shaft 42 against the action of a spring 70 attached to a depending arm 73 of lever 69.

Arm 71 of lever 69 terminates in a bifurcation, between the prongs or tines 72 of which rides a lip 74 of a bail 75 carried pivotally on the bell crank 54 (Figs. 1

4

and 3). During the selection period, the slides 15 are held in their rightward position (Fig. 1) by the engagement of lip 74 with the shoulders 76 of said slides. At the end of the fifth impulse interval, the function clutch cam 32 will rotate the lever 64 clockwise, to impart counterclockwise rotation to the four-armed lever 69. The arm 71 of said lever 69 will, through bifurcations 72, rotate the bail 75 clockwise to withdraw the lip 74 thereof from the shoulder 76 to permit those slides which have been unlatched by the latches 41, to be actuated leftwardly by their individual springs 58 to position the portions 63 beneath the punches 44 to be operated. In timed relation therewith, in a manner to be described, the toggle mechanism 14 will be operated, to raise the bar 48 (and engaged slides 15) and to move the bell crank 54 leftward, thus also moving the bail 75 leftwardly. Incidentally, the prongs 72 are of sufficient length to permit this leftward movement of lip 74 without disengagement from arm 71. Before the toggle mechanism 14 is returned to the position shown in Fig. 1, the lever 69 will have been returned to its position shown in Fig. 1 thereby rotating the bail 75 counterclockwise to bring the lip 74 thereof again into the path of the shoulders 76, so that upon completion of the return movement (rightwardly) of the toggle mechanism 14, including bail 75, the slides 15 will be intercepted by the lip 74 and returned to their rightward position, shown in Fig. 1, in latching relation with latches 41.

The effectuation of this operation of the toggle mechanism 14 is governed by the function clutch 13 in the following manner. As the function clutch cam 32 was rotated, as previously described, to actuate the bell crank lever 64 clockwise to impart counterclockwise rotation to the four-armed lever 69, the arm 77 of said lever 69 was actuated counterclockwise to effect its disengagement from a clutch release lever 79 fixed to a rock shaft 81. Also fixed to the rock shaft 81 (Figs. 1 and 4) is a friction clutch latch lever 82 terminating in a laterally directed portion 83 normally in blocking relation with a clutch shoe lever 84. Rock shaft 81 carrying levers 79 and 82 thereon is normally biased in a counterclockwise direction by a spring 85 attached to an arm 86 on lever 79. Thus, when the arm 77 of lever 69 is rotated out of blocking relation with arm 79, the shaft 81 is permitted to rock counterclockwise to impart similar motion to latch lever 82 to withdraw portion 83 thereof out of the path of the clutch shoe lever 84 and permit the clutch 13 to engage, and drive the function cam sleeve 80 through a complete cycle of revolution. Also, fixed to the rock shaft 81 is a restoring lever 87 (Fig. 4) which cooperates with a stud 90 on a cam disc 88 fixed to the cam sleeve 80, and which will rock the shaft 81 in a counterclockwise direction, Fig. 4 (clockwise in Fig. 1) to rock lever arm 79 clockwise sufficiently to permit lever arm 77 to become re-engaged therewith, as shown in Fig. 1, and to rock the lever 82 to bring the extremity 83 thereof into blocking relation with the lever 84, and thus restore the clutch tripping mechanism to its normal condition with arm 77 of lever 69 again into blocking relation with arm 79, as shown in Fig. 1. Therefore, as the clutch 13 is tripped, in the aforedescribed manner, the cams 88 and 89 on sleeves 80 (Fig. 4) cooperate with a bail 91 which, through a link 92 and lever arm 93 rocks the shaft 53 to operate the toggle mechanism 14 (Fig. 1), back and forth, as previously described.

As set forth in said copending application, Serial No. 725,935, the punch selector slides 15 have articulated thereto a corresponding series of transfer levers 94 which control the selective positionment of a corresponding series of pulse beams 95, all mounted on a transfer mechanism 96, the function of which is to transfer the selections from the punch mechanism to the printing mechanism.

Modification

A modification of the invention is shown in Fig. 5. In the following description of this embodiment those parts which have reference numerals the same as parts already described are identical therewith. Only those parts are shown and described which are considered necessary to differentiate from the first embodiment.

The shaft 12 has the selector cam sleeve 16 therearound which is under the control of a selector clutch (not shown in Fig. 5) but comparable to clutch 10. The selector cams are represented by the selector cam 24 and the selector levers are represented by the selector lever 33. The selector levers are all mounted pivotally on the shaft 35 and are spring biased clockwise about the shaft 35 by individual springs. When a marking impulse is received, the armature 22 is pulled up by the selector magnet (not shown), and the selector lever 33 is allowed to be biased in a clockwise direction when the cam follower portion 34 thereon engages the low part of cam 24.

A set of five selector interponents, represented by interponent 36 are pivotal on shaft 37, and all are spring biased clockwise about the shaft 37 by springs 38 secured thereto. The shaft 37 is positioned within the slotted portion in each selector interponent 36. Each of the slots has an upper horizontal surface which allows the selector interponent 36 to slide horizontally a predetermined amount. In normal unselected position the interponents 36 are resting with the right extremities thereof on the top step of a stepped portion of the selector levers 33. When any of the selector levers 33 become selected they move clockwise sufficiently to allow the rightward extremities of the interponents 36 to fall onto steps or shoulders 39. Thereafter, as the selector cams 24 continue rotating, the extra high portions thereof engage the follower portions 34 to pivot the selector levers 33 counterclockwise. The upper portion of the selector levers 33 which have been moved in response to a spacing impulse slide beneath the rightward extremities of the unselected selector interponents 36, and the selector levers 33 which have been moved in response to a marking impulse move the corresponding interponents 36 to the left, during which movement, the left ends of the interponents 36 will impinge against associated selector slide latches 41, and will rock the latches 41 counterclockwise about a pivot shaft 42 against the action of a contractile spring 43 individual to each latch 41. The spring 43 normally holds the latches 41 in latching engagement with an associated punch slide 15.

As described in the first embodiment of the invention, the punch selector slides 15 are suitably mounted for horizontal sliding motion in a punch actuator bail 47. Slides 15 are slidably mounted at their right ends on a pivot shaft 51 and are normally urged leftwardly by individual springs 58. Each of the punch selector slides 15 has a latching portion 59 formed on it which cooperates with a latching shoulder 61 formed on its associated selector slide latch 41 so that when the latch 41 is in its clockwise position, as shown in Fig. 5, it will prevent an unselected slide 15 from moving leftwardly. However, when the selector slide latch 41 is rocked to its counterclockwise position by the associated push bar 36, the latching shoulder 61 will be moved out of the path of the latching portion 59, and the spring 58 will move the punch selector slide 15 to the left, when permitted to do so by the member 75 as will presently appear, to present the shoulder 62 over the cross bar 48.

In the modified form of the invention shown in Fig. 5, an additional slide 97 is provided adjacent to the punch selector slides 15. Slide 97 is slidably mounted on shaft 51 and is normally biased leftwardly by a spring 98 (comparable to spring 58). Universal slide 97 is provided with a rightwardly directed extension which terminates in a shoulder portion 99. Slide 97 (like slides 15) is suitably mounted for horizontal sliding movement in

the bail 47. Shoulder portion 99 of the universal slide 97 cooperates with the laterally directed extremity 101 of arm 102 of a U-shaped function-clutch release-bail 103 mounted pivotally on a pivot shaft 104. Bail 103 is also provided with an arm 105 which terminates in a shouldered portion 106 adapted to cooperate with a stop projection 107 of a clutch 108, such as disclosed in said Nilson et al. Patent No. 2,568,249. Bail 103 is normally biased counterclockwise (as viewed in Fig. 5) by a spring 109. Fixed to bail 103 is a reset arm 110 adapted to return the shouldered portion 106 into latching relation with projection 107 of clutch 108, in well known manner.

As in the form of the invention shown in Fig. 1, when the high portion of the function clutch cam 32 (Fig. 5) comes into engagement with the cam follower portion 65, the lever 64 will be rocked clockwise about the stud shaft 67 to rock a three-armed lever 111 in a counterclockwise direction about the shaft 42 against the pull of the spring 112 attached to depending arm 115 of lever 111. Arm 113 of lever 111 terminates in a bifurcation, between the prongs 114 of which rides the lip 74 of the bail 75 carried pivotally on the bell crank lever 54 which forms a part of the aforementioned toggle mechanism 14.

The universal slide 97, like the punch selector slides 15, is also provided with a shoulder 76. Thus, the lip 74 in the embodiment shown in Fig. 5, spans not only the punch selector slides 15, but also the universal slide 97, so that during the selection period, the punch selector slides 15 and the universal slide 97 are all held in their rightward position by the engagement of said lip 74 with the shoulders 76. Another point of distinction between the slides 15 and the universal slide 97 resides in the fact that the universal slide 97 is not provided with a latching portion 59, and hence there is no selector slide latch 41 provided for the universal slide 97. Thus, it is seen that the punch selector slides 15 are released permissively under the selective control of the latches 41, while the universal slide is released invariably when the lip 74 is removed from engagement with the shoulders 76.

In the operation of the form of the invention shown in Fig. 5, the selection interval is initiated upon the receipt of a spacing start impulse to release the selector cam sleeve 16 for one cycle of rotation, as previously described, to cause cams 24 to effectuate, through levers 33, push bars 36 and latches 41, the conditioning of slides 15 for release under the control of the toggle mechanism 14, since, during the selection period, the slides 15 are held in their rightward position by the engagement of lip 74 with the shoulder 76 of the slides. During the fifth impulse interval, the function clutch cam 32 will rotate the lever 64 clockwise, to impart counterclockwise rotation to the three-armed lever 111. The arm 113 of said lever 111, through bifurcations 114, rotates the bail 75 clockwise to withdraw the lip 74 thereof from the shoulder 76 to permit those slides 15 which have been unlatched by the latches 41, and invariably the slide 97, to be actuated leftwardly by their individual springs 58 and 98, respectively. The selected slides 15 will present their shoulder 62 over the cross bar 48, and their portions 63 under the punches 44 to be operated.

The universal slide 97, which has no portions comparable to shoulder 62 and portion 63, will, upon being actuated leftwardly by its spring 98, cause its shouldered extension 99 to actuate the bail 103 in a clockwise direction (the spring 98 being stronger than the spring 109) to disengage the shoulder 106 from the stop portion 107 of the function clutch 108, thus initiating rotation of clutch 108 and its associated cams. Since the times of movement of punch selector slides 15 and universal slide 97, under the tension of their respective springs 58 and 98 are substantially equal, the shoulder 106 is dis-

engaged from the stop portion 107 of function clutch 108 substantially coincidentally with the positionment of shoulders 62 of slides 15 over bar 48. Thus engagement of clutch 108 does not occur until all slides 15 have fully engaged bar 48, and thus a complete overlap is obtained. Clutch 108, comparable to clutch 13 (Fig. 4) is provided with cams (not shown) comparable to cams 88 and 89 (Fig. 4) one of which carries a lug comparable to lug 90 which cooperates with arm 110 to reset the clutch 108 to its normal stop condition, and both of which cams cooperate with the operating lever 91 (Fig. 4) to operate the toggle mechanism 14 in the manner previously described, to perform a perforating operation, and thereafter to restore the punch selector slides 15 and the universal slide 97 to their positions shown in Fig. 5.

In prior devices, the function clutch cam lever, analogous to lever 64, acts directly upon the stop lug 84, Fig. 1 (or 107, Fig. 5) to positively trip or release the function clutch 13 (or 108). The function clutch trip cam 32 on the selector cam assembly must operate, through its lobe 121, the bell crank 64 during the last practical moment of the selector cam sleeve operating cycle in order that the function cam assembly shall not begin to perform its operation until the last of the five selector elements has settled in its selected position. At the same time it is desirable to spread the function cam over as much of the three hundred sixty degrees of arc of the cam assembly as possible, in order that the function shall be performed smoothly and without abruptness. The limit position of the cam lobe 121 is determined by reason of the fact that the cam follower portion 65 of the lever 64, and the rise of the cam lobe 121 must be of finite size for practical operation, and also because, when the selector cam sleeve assembly is at rest, there must exist a gap between the cam follower 65 and the trailing face of the tripping lobe 121 to provide orientation range adjustment (as is well known in the art).

Moreover, because the function clutch is thus initiated into rotation, in the prior systems exemplified by Fig. 6, before the entire signal code combination has been fully received by the selector, the effective portion of the function cycle cannot begin until the instant indicated in Fig. 6 by the numeral 125. Thus, it is seen that a certain portion of the function cycle, namely X degrees (in the order of 22 to 48 degrees) is not available for effective use.

With the arrangement according to the present invention, the entire cam cycle (360 degrees) is available for effective operation of the tape punching mechanism, as indicated in Fig. 7, because the tripping of the function clutch 13, Fig. 1 (or 108, Fig. 5) is delayed through the instrumentality of a system of cooperative mechanical elements intervening the clutch tripping cam 32 and the clutch tripper 82, Fig. 1 (or 103, Fig. 5), and including a permissively operable element. Thus, to delay the engagement of the function clutch until the end of the No. 5 code impulse interval, as indicated in Fig. 7, the cam lobe 121 acts upon the bell crank 64 at the same instant as indicated in Fig. 6, but through said instrumentality of intermediate mechanical elements, such as levers 69 and 79 (Fig. 1), the time the assembly consisting of levers 79 and 82 requires to rotate, under the impetus of its contractile spring 85, out of engagement with clutch shoe lever 84 of the function clutch 13 including time for spring 85 to overcome the inertia of lever 79—81—82 (exemplified by the curve 126, Fig. 7) is sufficient to insure that the entire character code combination of signal impulses received by the selector mechanism is transferred to the punch assembly, leaving the entire function cam cycle of 360 degrees available for operation of the tape punching mechanism. Contributing also to the delay interval 126 introduced between the tripping of lever 64 by lobe 121, and the beginning of rotation of function clutch 13 is the amount of overlap

between the extremity 127 of arm 77 and the end of lever 79, thus exemplifying the escape or disengagement time between levers 77 and 79.

Although certain embodiments of the invention have been shown in the drawings and described in the accompanying specification, it is understood that the invention is not limited thereto, but is capable of modification and rearrangement without departing from the spirit and scope of the invention.

What is claimed is:

1. In combination in a telegraph perforator, signal responsive means, a plurality of punches, latch means controlled by said signal responsive means, punch interponents conditioned for operation by said latch means in accordance with the signal received, punch interponent restraining means, punch operating means, a function clutch means for controlling said punch operating means, disabling means controlled by said signal responsive means for disabling said restraining means, and means effective under the control of said disabling means to initiate operation of said function clutch means, whereby said punch operating means is operated directly upon the completion of operation of said signal responsive means to provide a complete overlap between the selecting operation and the punching operation.

2. In combination in a telegraph perforator, signal responsive means, a plurality of punches, latch means controlled by said signal responsive means, punch interponents conditioned for operation by said latch means, in accordance with the signal received, punch interponent restraining means, punch operating means, a function clutch means for controlling said punch operating means, an additional member normally restrained by said restraining means, means operated by said signal responsive means to control said restraining means to thereby control said universal member, and means controlled by said additional member to control said function clutch means, whereby said punch operating means is operated directly upon the completion of operation of said signal responsive means to provide a complete overlap between the selecting operation and the punching operation.

3. In combination in a telegraph perforator, signal responsive means, a plurality of punches, latch means controlled by said signal responsive means, punch interponents conditioned for operation by said latch means in accordance with the signal received, a punch bail for actuating said punches which have been rendered operable by said interponents, a power shaft, toggle means cooperably associated with said power shaft for actuating said punch bail, punch interponent restraining means carried by said toggle means, function clutch means for controlling the transmission of power to said toggle means, an additional member normally restrained by said restraining means, means operated by said signal responsive means to control said restraining means to thereby control said additional member, and means controlled by said additional member to control said function clutch means, whereby said toggle means is operated directly upon the completion of operation of said signal responsive means to provide a complete overlap between the selecting operation and the punching operation.

4. In combination in a telegraph perforator, signal responsive means, a plurality of punches, latch means controlled by said signal responsive means, punch interponents conditioned for operation by said latch means in accordance with the signal received, a punch bail for actuating said punches which have been rendered operable by said interponents, a power shaft, toggle means cooperably associated with said power shaft for actuating said punch bail, punch interponent restraining means carried by said toggle means, function clutch means for controlling the transmission of power to said toggle means, disabling means controlled by said signal responsive means for disabling said restraining means, and means effective under the control of said disabling means

to initiate operation of said function clutch means, whereby said punch operating means is operated directly upon the completion of operation of said signal responsive means to provide a complete overlap between the selecting operation and the punching operation.

5. In combination in a telegraph perforator, signal responsive means, a plurality of punches, latch means controlled by said signal responsive means, punch interponents conditioned for operation by said latch means in accordance with the signal received, a punch bail for actuating said punches which have been rendered operable by said interponents, a power shaft, toggle means cooperably associated with said power shaft for actuating said punch bail, punch interponent restraining means carried by said toggle means, function clutch means for controlling the transmission of power to said toggle means, a universal member normally restrained by said restraining means, disabling means operated by said signal responsive means to disable said restraining means to thereby control said universal member, and means controlled by said additional member to control said function clutch means, whereby said toggle means is operated directly upon the completion of operation of said signal responsive means to provide a complete

overlap between the selecting operation and the punching operation.

6. In a code signal responsive selector mechanism, a selector cam assembly cyclically operable for each received code signal combination, a plurality of selector elements positionable according to selective attributes of received signal elements at intervals timed by said selector cam assembly, a second cam assembly for giving effect to the selective setting of said selector elements, a clutch for driving said second cam assembly, a tripper for said clutch, a clutch tripping cam on said selector cam assembly, and a system of cooperative mechanical elements intervening said clutch tripping cam and said clutch tripper and including at least one permissively operable mechanical element for delaying the operation of said clutch tripper relative to the time of operation of said clutch tripping cam upon an element of said system.

References Cited in the file of this patent

UNITED STATES PATENTS

2,490,608	Zenner	Dec. 6, 1949
2,595,745	Zenner	May 6, 1952