April 7, 1942. F. E. D'HUMY 2,279,161

PRINTING TELEGRAPH RECORD FORM

Filed Nov. 16, 1940

FIG. 1

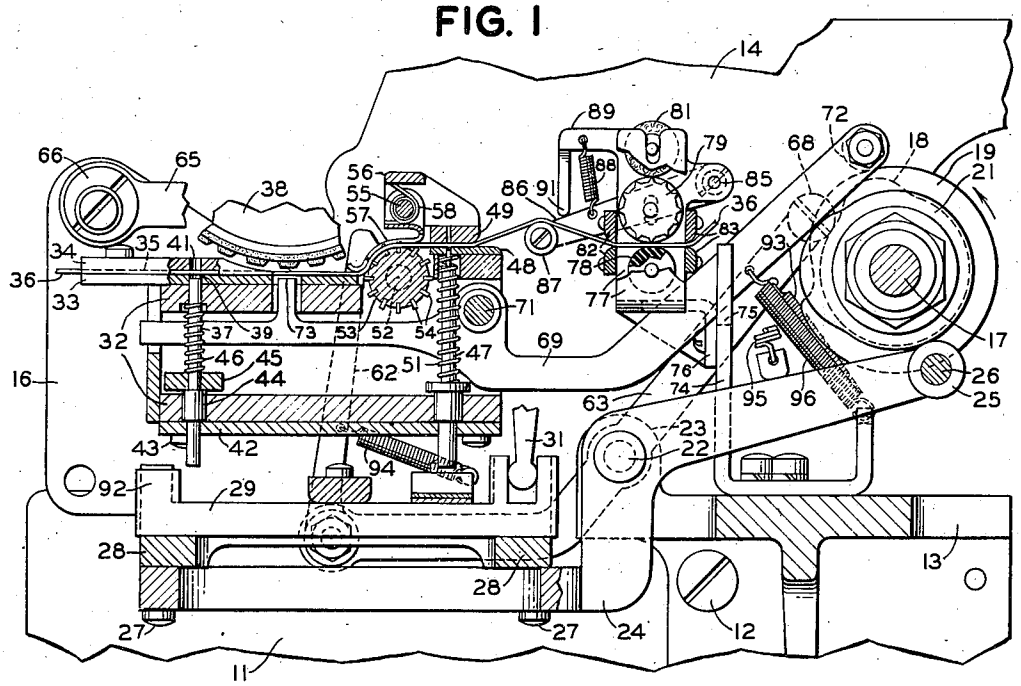


FIG. 2

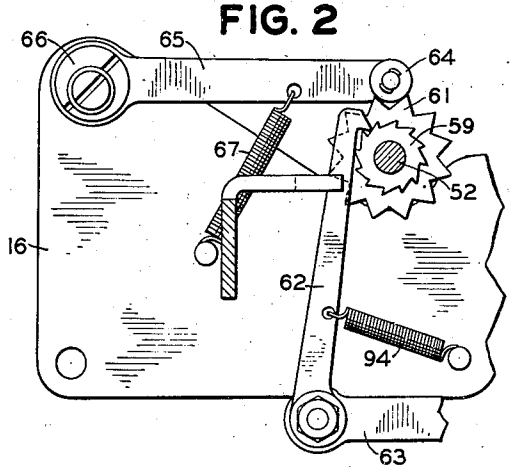


FIG. 3

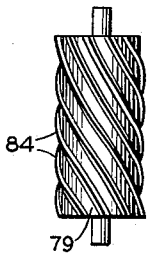
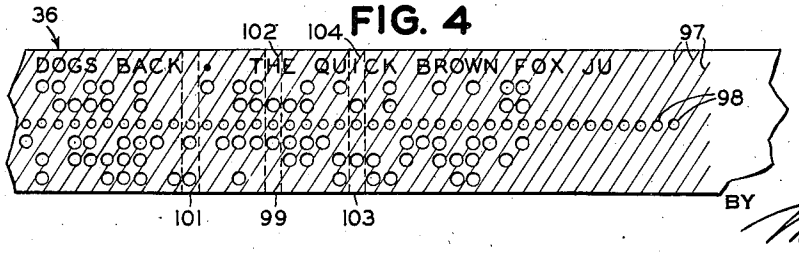


FIG. 4



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PRINTING TELEGRAPH RECORD FORM

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Application November 16, 1940, Serial No. 365,851

4 Claims. (Cl. 178—112)

This invention relates generally to a new and improved type of record form employed in combined printing and punching telegraph recorders, and to the method of and means for preparing the record form.

In certain types of telegraph systems a record form is used in which the telegraph signals are recorded both as printed characters and as coded punchings on and in the form respectively. These forms are prepared by recording mechanisms which are capable of simultaneously printing and punching a record form under the control of a common selector mechanism responding to the telegraph signals. Examples of telegraph instruments of this general character are disclosed in Patent No. 2,174,731 granted October 3, 1939, to R. F. Dirkes et al. and entitled "Combined telegraph printer and perforator," and in Patent No. 2,143,828 granted January 10, 1939, to R. F. Dirkes et al. and entitled "Telegraph printer-reperforator." Both of these instruments employ type-wheel printing apparatus in which the type are arranged in a single row. These instruments are designed in such a manner that the printed characters and the coded punchings corresponding thereto are in registry in the same transverse sections of the record form. However, there are other types of printer-reperforators which, for structural or other reasons, are arranged so that the printed characters and the punchings corresponding thereto may not be recorded in the record form in the same transverse sections. Certain forms of type bar printing mechanisms equipped with punching facilities are not adapted to effect both recordings of the telegraph signals in the same transverse section of the record form. Also, an instrument of the general character of either of the machines disclosed in the aforementioned patents, when equipped with a multiple row type-wheel which is shiftable axially in order to print from any of the rows of type, requires a slight modification to permit the use of a multiple row type-wheel, thereby necessitating that the punching mechanism be displaced longitudinally of the record form. The result of such a modification is that the coded punchings and the printed characters corresponding thereto are not in registry in the same transverse section of the record form.

The displacement of the two records made in the record form makes it relatively difficult to associate any particular set of punchings with the corresponding printed characters. In the operation of some systems employing this type of record form it is frequently necessary to separate one portion of the form from the rest for the purpose of using the coded punchings to control the operation of a special transmitter. For example, printed and punched tape may be used to record all of the communications at a central point originating at a branch station, which communications may be destined for any one of a large number of distant stations. There may be at times a considerable accumulation of prepared tape awaiting transmission and including an urgent communication interspersed with others of a routine nature. To expedite the transmission of the urgent communication that portion of the tape in which it is recorded is separated from the rest of the tape and inserted in a separate transmitter having a direct connection to the station of destination. It therefore becomes necessary to determine quickly upon inspection the portion of the tape which is to be separated. Where the printed characters and the punchings corresponding thereto are displaced longitudinally of the tape, it is difficult for any but a highly skilled attendant to determine at a glance the exact point at which the tape is to be severed. Also, where a tape prepared in this manner is to be inserted in a transmitter, difficulty arises in determining just which row of coded punchings are to be inserted over the transmitter feeler pins.

Accordingly, it is a major object of the instant invention to provide a record form having non-registering printed characters and coded punchings corresponding thereto and also markings serving to link the printed characters and the corresponding punchings.

Another object of the invention is to provide a method of and means for preparing a combination printed and punched record form in which the printed characters and the coded punchings corresponding thereto are displaced longitudinally of the form and in which the visual association of corresponding printed and punched characters is facilitated.

Still another object of the invention is the provision of a mechanism for simultaneously printing, punching and marking a tape whereby difficulties of tape inspection occasioned by non-registry of the printed characters and the coded punchings corresponding thereto are obviated to a large extent by the markings.

A further object of the invention is to provide means for preparing a tape with non-registering printed characters and coded perforations corresponding thereto and also with oblique mark-

ings linking the printed characters and the corresponding perforations.

The invention is disclosed herein as applied to the type of telegraph printer-reperforator disclosed in detail in Patent No. 2,143,828 to which reference has been made. The recording mechanism comprising a typewheel and a set of punch pins is selectively operated in response to telegraph signals to substantially simultaneously print and punch the tape in accordance with a single selection operation. The recording mechanism, by reason of structural limitations, is arranged so that the punching and printing operations occur at different transverse sections of the tape. The apparatus is also supplied with a marking device by means of which oblique parallel lines are printed upon the tape so that each line passes through a printed character and intersects one edge of the tape at a point registering with the transverse section of the tape in which the coded punchings corresponding to the printed character appear.

For a more complete understanding of the invention the following detailed description is given in conjunction with the acompanying drawing, of which:

Fig. 1 is a fragmentary sectional view of the recording and marking mechanisms together with the actuating apparatus therefor;

Fig. 2 is a fragmentary view of the tape feeding mechanism;

Fig. 3 is a view of the roller employed to effect the oblique markings upon the tape; and

Fig. 4 is a view of the tape prepared by the recording apparatus.

The invention described in the following portion of the specification is shown together with only those parts of the mechanism deemed necessary for an understanding thereof. For a complete disclosure of the apparatus of which the instant invention is an improvement, reference is made herein to the aforementioned patent to Dirkes et al. No. 2,143,828. Having reference first to Fig. 1 of the accompanying drawing, the main frame casting of the combined printer-reperforator is provided with a front section 11 which is attached to the main frame by a plurality of screws such as 12. An offset bracket casting 13 is shown attached to the front side of the section 11. The main frame casting is also provided with a section 14 to which is attached a punch and fed mechanism mounting plate 16. The printing and punching operations are performed by mechanisms actuated by a series of pivoted levers controlled in a manner to be described by a plurality of rotating cams. A cam operating shaft 17 which is adapted to be rotated once for every operation of the selector mechanism is suitably journaled in bushings (not shown) attached respectively to the bracket 13 and to the section 14 of the main casting. Securely attached to one portion of the shaft 17 is a group of three disc cams 18, 19 and 21, which are spaced from one another along the axis of rotation of the shaft by means of suitable spacers. These three disc cams 18, 19 and 21 are hereinafter referred to as the tape feed cam, the printing cam, and the punching cam, respectively, and are operated in a manner to be described to control these functions of the apparatus.

A rod 22 is supported at its front end in the front section of the bracket 13 and at its rear end in a boss 23 which forms part of the bracket 13. The rod 22 serves to pivotally support a punching lever 24, the right hand end of which carries a cam follower 25 which is secured to the lever by means of a pin or screw 26 and is adapted to engage the punching cam 21. The left hand end of the punching lever 24 is substantially horizontal and has attached to the upper side thereof by a plurality of screws such as 27 a substantially H-shaped block 28. This block is provided with five longitudinal slots in each of which there is a punch pin interponent bar 29 which is adapted to slide back and forth therein. The right hand ends of the interponent bars 29 and bifurcated for the purpose of receiving individual interponent actuating levers such as 31. These actuating levers are operable to move either to the right or to the left as shown in the drawing under the control of the selector mechanism which is responsive to the telegraph signals.

Attached to the front side of the punch and feed mechanism mounting plate 16 is a punch block 32 which has attached to the top thereof two plates 33 and 34. A small recess 35 is formed between the two plates 33 and 34 and serves to guide the tape 36 over a row of five punch pins such as 37 and also beneath a typewheel 38. The lower plate 33 is provided with five holes such as 39 arranged in alignment transversely of the tape 36 and serve to guide the five punch pins 37. A similar row of holes 41 is arranged in the upper plate 34, each in alignment with a corresponding hole 39 in the lower plate 33. The holes 41 serve as dies cooperating with the punch pins to form perforations in the tape as the punch pins are forced upward in a manner to be described. The lower ends of the punch pins such as 37 are guided by means of a series of holes formed in a plate 42 which is attached by means of a plurality of screws such as 43 to the underside of the punch block 32. Each of the punch pins is provided with a shoulder such as 44, the bottom faces of which normally rest upon the upper surface of the plate 42. Resting upon the upper faces of the shoulders on the punch pins is a plate 45 which in cooperation with compression springs which may be individual to each of the punch pins such as 46 causes the punch pins which are forced upward to be returned to their normal positions in a manner to be described. The punching apparatus is provided with an additional punch pin 47, the purpose of which is to form feed holes in the tape. The feed hole punch pin 47 is guided adjacent its lower end by a hole in the plate 42 and at its upper end by a hole in a plate 48. A hole in a plate 49 located above the plate 48 serves as a die for the upper end of the feed hole punch pin 47. A suitable recess formed between the plates 48 and 49 serves to guide the tape over the feed hole punch pin. This punch pin is also provided with a compression spring 51 which tends to hold the feed hole punch pin 47 in its normal lower position.

A tape feed shaft 52 is suitably supported by means (not shown) attached to the top of the punch block 32. The shaft 52 serves to support a drum 53 which is approximately equal in length to the width of the tape 36 and which is provided with a circumferential row of pins 54 extending radially from the periphery of the drum. These pins are spaced apart distances equal to the distance between the feed holes formed in the tape by the feed hole punch pin 47 and are adapted to advance the tape through the punch block upon rotation of the cylinder

53. A rod 55 is supported between the legs of an inverted U-shaped member 56 and serves to pivotally mount a guide member 57 which cooperates with a spring 58 coiled about the rod 55 to hold the tape in engagement with the pins 54.

The driving mechanism for the feed wheel is illustrated in Fig. 2. Adjacent the rear end of the shaft 52 are secured a ratchet wheel 59 and a star wheel 61. A ratchet dog 62 is pivotally mounted on the left hand end of a feed lever 63 and cooperates with the ratchet wheel 59 to rotate the shaft 52 and thereby advance the tape. The star wheel 61 cooperates with a detent roller 64 which is supported at the right hand end of a pivoted lever 65 to hold the shaft 52 in its rotated position in a manner and for a purpose well known in the art. The lever 65 is pivoted at its left hand end on an eccentric shoulder screw 66 which extends from the mouting plate 16 and has attached thereto a spring 67 which normally urges the detent roller 64 into engagement with the star wheel 61. The feed wheel operating lever 63 is pivoted between its extremities upon the rod 22 (Fig. 1) and carries at its right hand extremity a cam follower 68 which is adapted to engage the tape feed cam 18.

A printing lever 69 is pivotally mounted on a stud 71 extending from the punch block 32 and carries at its right hand end a cam follower 72 which is adapted to engage the surface of the printing cam 19. Adjacent the left hand end of the printing lever is an upstanding section 73 which extends through suitably aligned holes in the punch block 32 and the plate 33 to a point adjacent one edge of the tape 36 directly below the typewheel 38.

A guide bracket 74 is attached to and extends upwardly from the bracket 13 and is provided adjacent its upper extremity with a slot 75 in which the printing lever 69 is adapted to operate, the slot serving as a guide for this lever. An angular bracket 76, also provided with a suitable slot to accommodate the printing lever 69, is attached to the bracket 74 and serves to support a pair of spaced bearing plates 77. These bearing plates serve to journal a plurality of rollers 78, 79 and 81 arranged vertically with respect to one another. Spanning the bearing plates 77 are guide plates 82 and 83 which serve to guide the tape 36 between the rollers 78 and 79. The roller 78 serves as a platen for the printing roller 79. The roller 81 is an inking roller which is rotated frictionally by the printing roller 79 to supply ink to the latter roller.

The printing roller 79 is shown in detail in Fig. 3. Formed on the surface of the printing roller is a series of spaced ribs 84 which travel spirally around the roller. The distance measured normal to the axis of rotation of the printing roller 79 between the ribs 84 is equal to the distance between feed holes of the tape. The purpose of the printing roller 79 is to mark the tape with a series of spaced oblique lines in a manner and for a purpose to be described hereinafter.

Pivotally mounted at 85 upon one of the bearing plates 77 is a lever 86 which carries at its free end a roller 87. A spring 88 attached at one end to the lever 86 and at the other end to an extension 89 of one of the bearing plates 77 serves to urge the lever 86 upward into engagement with a stop 91 which is attached to or formed in the extension 89. The tape 36, as it issues from between the guide plates 82, is led over the roller 87 and into the recess provided between the plates 48 and 49 and thence through the feeding, punching and printing mechanism, as described.

In describing the sequence of operations of the apparatus embodying the invention, assume that the selector mechanism has been operated in response to a telegraph signal. The interponent actuating levers such as 31 are operated under the control of the selector mechanism to position the punch pin interponent bars such as 29 either to the left or right. The interponent bars which are moved to the right are then in such positions that the vertical projections such as 92 formed in their left hand ends are located beneath their associated punch pins such as 37. The type wheel 38, also in response to the selector mechanism, is rotated to a position bringing the type element of the selected character directly over the vertical section 73 of the printing lever 69. With the recording mechanisms selectively operated as described, the cam shaft 17 is rotated through one revolution in the direction of the arrow. The raised portion of the tape fedeing cam 18 is first brought into engagement with the cam follower 68, thereby pivoting the tape feeding lever 63 in a clockwise manner to actuate the ratchet dog 62 as described to advance the tape 36 a distance of one character. The disengagement of the cam follower 68 from the raised portion of the tape feeding cam 18 permits the restoration of the tape feeding lever 63 by means of a retractile spring 93, one end of which is attached to the tape feeding lever and the other end of which is attached to a suitable fixed portion of the frame structure such as a part of the bracket 74. The ratchet dog 62 is carried upward and is brought into engagement with another tooth of the ratchet 59 by means of a retractile spring 94.

Continued rotation of the cam shaft 17 effects the engagement of the raised portion of the punching cam 21 with the cam follower 25. The punching lever 24 is thus rotated about the rod 22 in a clockwise manner, raising the set of punch pin interponent bars sufficiently to cause the vertical projections such as 92, which have been moved to points under their associated punch pins, to drive these punch pins upward through the tape 36, thereby recording in the tape coded punchings corresponding to the selected character. The disengagement of the cam follower 25 from the raised portion of the punching cam 21 permits the restoration of the punching lever 24 and the mechanism controlled thereby to normal under the control of a retractile spring 95. The compression springs such as 46 with which some or all of the punch pins 47 are provided act upon the plate 45 to move it downward. The downward movement of this plate effects the withdrawal of those punch pins which had been elevated to perforate the tape.

Following the tape punching operation the cam follower 72 becomes engaged with the depressed portion of the printing cam 19, thereby allowing the printing lever 69 to be pivoted clockwise about the stud 71 by a spring 96. Such movement of the printing lever raises the vertical section 73 to press the tape 36 against the selected type element of the type wheel 38 in order to take the desired imprint therefrom. Thereafter the raised portion of the printing cam 19 engages the cam follower 72 to withdraw the vertical section 73 of the printing lever 69 by pivot-

ing this lever against the action of the spring 96 in a counterclockwise manner.

Each movement of the tape 36 through the recording apparatus by the tape feeding mechanism is accomplished in a relatively short space of time. It is generally difficult, and in most cases undesirable, to draw the tape from the source of supply in such a short time. Accordingly, the tape which is fed to the recording apparatus is first drawn from the loop formed between the guide plates 48—49 and 82, thereby pivoting the arm 86 counterclockwise against the action of the spring 88. Immediately following this operation, the spring 88 is effective to pivot the arm 86 relatively slowly back to its normal position, thereby drawing tape from the source of supply, such as a tape reel, between the rollers 78 and 79. This movement of the tape between these rollers causes rotation thereof which results in the marking upon the tape of a series of spaced oblique lines by the roller 79. Obviously, other means for rotating the roller 79 may be employed within the scope of the invention. For example, the feed wheel shaft 52 may be geared, or otherwise positively coupled, to the shaft of the marking roller 79.

A section of the record form prepared by the apparatus and in the manner described is shown in Fig. 4. Some of the spaced oblique lines which are marked upon the tape by the roller 79 of Fig. 1 are designated by the reference character 97. Also, the tape is provided with feed holes such as 98 prior to its passage to the recording mechanism. Consider the recording of the letter "H." The printed character is recorded in the transverse section of the tape 99 and the coded punched recording is made in the transverse section of the tape 101. These two recordings are separated from each other by other printed and punched recordings for the reasons hereinbefore discussed. One of the oblique lines 102 passes through the printed character "H" in the transverse section 99 and intersects the opposite edge of the tape in the transverse section 101. The coded punchings recorded in the transverse section 99, instead of corresponding to the printed character "H" also appearing in this section, correspond to the printed character "I" appearing in the transverse section 103, which two recordings are associated by the oblique line 104 linking these two transverse sections.

Thus it is apparent that, where structural limitations of the recording apparatus necessitate the displacement of the printed and punched recordings of characters longitudinally of the record form, the visual association of the corresponding recordings is materially facilitated by the oblique lines marked upon the record form. Hence, when it is desired to insert a tape prepared in this manner in a transmitter, it is only necessary to scan quickly along the line running through the printed character at the beginning of a message to the point where that line intersects the opposite edge of the tape. This point may then be readily aligned with the transmitter feeler pins or with some distinctive mark or index with which the transmitter may be provided to indicate the position of the feeler pins. A record form prepared in the manner described does not require the services of an attendant skilled in reading the coded punchings appearing therein nor does it require time-consuming counting of the number of recorded characters between any printed character and its corresponding coded punching.

The nature of the invention may be ascertained from the foregoing description of a method of and means for preparing the novel record form and the scope thereof is defined in the appended claims.

What is claimed is:

1. The method of preparing a record strip for a telegraph system which comprises marking said record strip with lines each linking two different transverse sections of said strip, recording each character in one form in one of said two different transverse sections, and recording each character in another form in the other of said two different transverse sections.

2. The method of preparing a telegraph record form which comprises marking said record form with spaced oblique lines, and recording each character in printed and punched code form respectively in the two spaced transverse sections of said record form linked by each of said oblique lines.

3. A record form for a printing telegraph system having two types of records of the same intelligence characters, said two types of records appearing in two different transverse sections of said record form, and reference marks linking said two different transverse sections.

4. A record form for a printing telegraph system having a printed record of intelligence characters, a punched code record of said characters, the printed and punched records of each character appearing in spaced transverse sections of said record form, and oblique lines linking said spaced transverse sections.

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