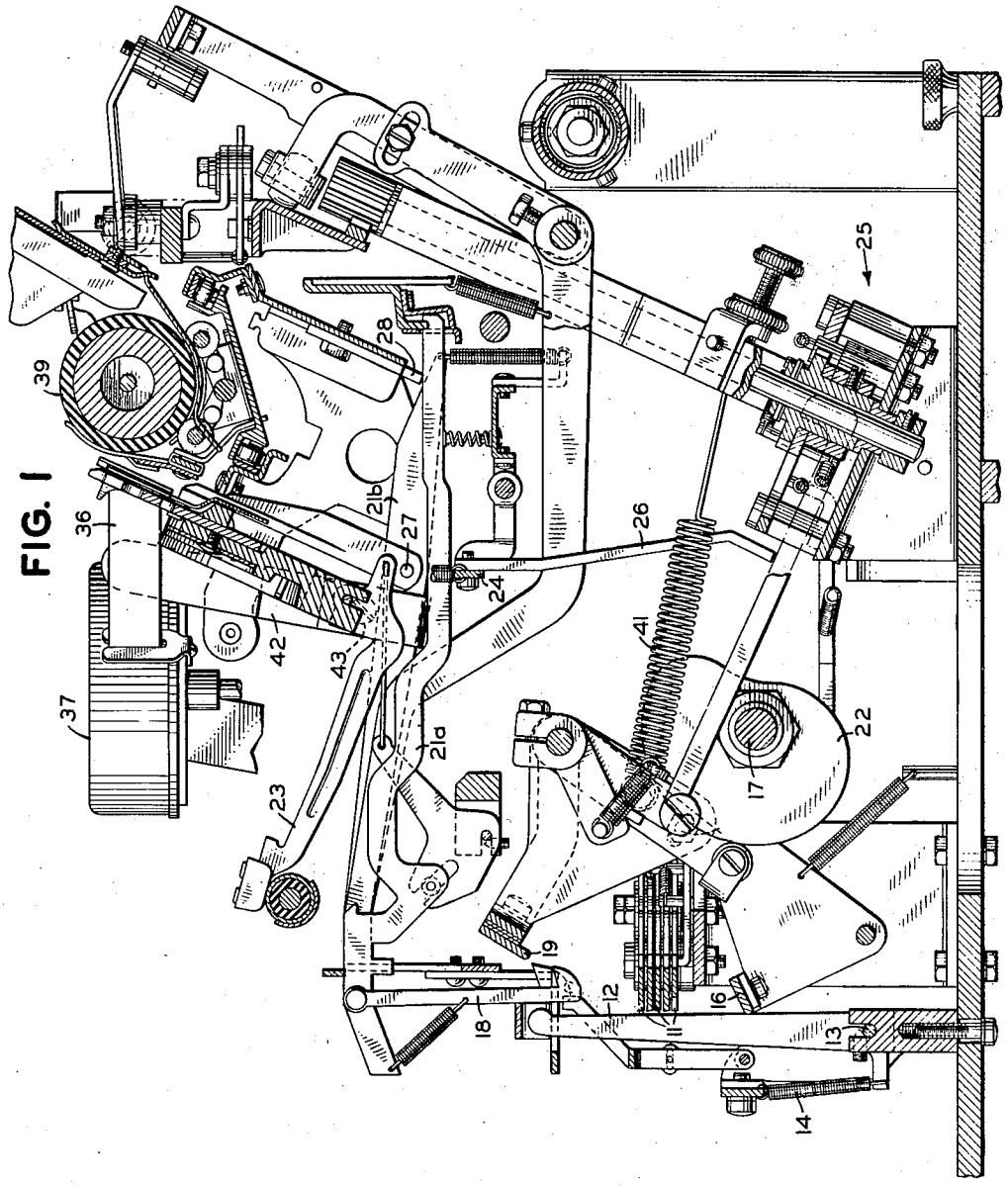
Aug. 4, 1942. P. A. NOXON ET AL 2,291,750

PRINTING APPARATUS

Original Filed Aug. 13, 1937 2 Sheets-Sheet 1

FIG. 1



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FIG. 2

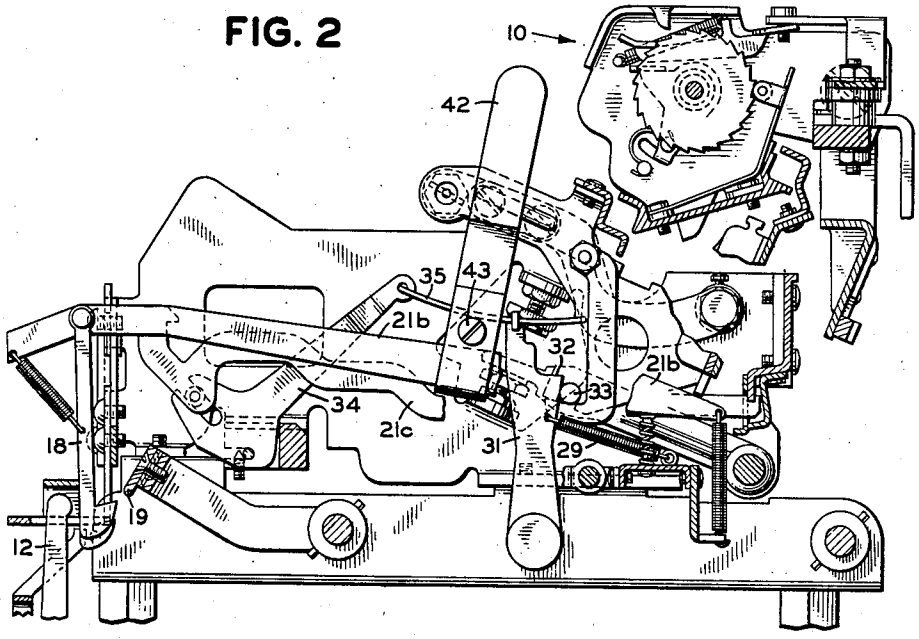
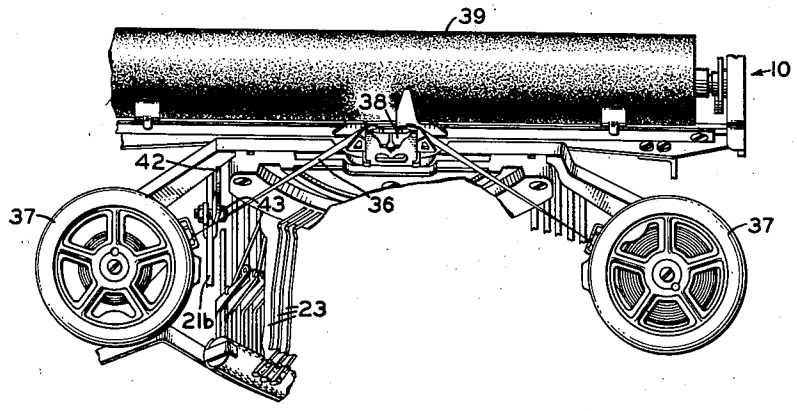


FIG. 3



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2,291,750

PRINTING APPARATUS

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Original application August 13, 1937, Serial No. 158,848. Divided and this application May 21, 1940, Serial No. 336,388

4 Claims. (Cl. 197—155)

This invention relates primarily to printing apparatus and more particularly to telegraph printing apparatus or that type of telegraph apparatus controlled by received signals to record representative characters on a recording medium. Although the invention is described and shown in the accompanying drawings as cooperating with a telegraph page printer of the type disclosed in a patent issued to P. A. Noxon et al., No. 2,231,215, granted February 11, 1941, entitled "Telegraph printer," it should be kept in mind that the invention may easily be applied to and operated in conjunction with various other types of printers wherein the problems solved by the invention are present, the invention being shown and described as cooperating with the above "telegraph printer" merely for the purpose of illustrating the principles thereof and the manner of applying the same to a printer.

The present application is a division of a patent issued to P. A. Noxon et al., No. 2,205,430, granted June 25, 1940, entitled "Printing telegraph apparatus."

In telegraph printers and particularly those of the type mentioned above an inking ribbon is usually employed to ink the type and a platen carriage for holding or supporting the recording medium is moveable to and fro to effect letter spacing and the return of the carriage for a new line of print and in addition is moved in a direction at right angles to the to and fro movement in response to shift and unshift signals to effect the recording of either one or the other of the two characters on the type bars. In such types of printers the supply spools for the inking ribbon are usually stationary with respect to the moveable carriage and the movement of the carriage from one shift position to another is likely to set up an abnormal tension in the inking ribbon. On the printing operations following such a shift operation wherein an abnormal tension is set up in the inking ribbon, a considerable portion of the inertia of the selected type bar may be absorbed in loosening the inking ribbon. This results in the printing operations immediately following such a shift operation being a substantial amount lighter than the other printed characters as the printing force imparted to each type bar is substantially uniform and where a considerable portion of this force or the inertia created thereby is absorbed by or in loosening the inking ribbon the printing blow of the typebar on the recording paper is necessarily abnormally light.

It is therefore an object of the invention to provide a mechanism for maintaining substantially uniform tension in the inking ribbon during all printing and printer function operations.

Another object of the invention is to prevent cutting of the inking ribbon by the type bars which results when the ribbon is too taut or tight.

Still another object of the invention resides in the ease with which the apparatus for accomplishing the above objects is attached to the printer and the minimum number of parts necessary to accomplish the same.

These and further objects of the invention will be apparent when taken in conjunction with the following descriptions and the accompanying drawings showing and describing the invention as operating in conjunction with a printer of the above mentioned type.

In the drawings

Fig. 1 is a vertical sectional view taken substantially through the transverse center of a telegraph printer of the above mentioned type showing the manner in which the invention is associated therewith;

Fig. 2 is a fragmentary vertical sectional view showing the mechanisms for controlling the shift and unshift movements of the platen carriage; and,

Fig. 3 is a fragmentary plan view of the invention and cooperating elements of the associated telegraph printer.

Referring first to Fig. 1, a brief and general description of the operation and arrangement of the elements in the above mentioned printer that cooperate with the elements of the invention will be given. As fully described in the above mentioned application, the printer is of the page printer type and comprises a platen carriage, indicated in general by reference to numeral 10, moveable to and fro to effect letter spacing and the return thereof for the beginning of new line of print and moveable in a plane at right angles to said to and fro plane of movement and inclined an appreciable amount from the vertical for case character recording. The movement of the platen carriage 10 in the plane inclined from the vertical is in response to shift and unshift signals and effects the printing of either the upper and lower case characters on the type bars.

The selecting mechanism of the printer includes a set of five horizontal permutation bars 11 arranged in superimposed relation adjacent the front of the printer. These bars are longitudinally moved or set in various combinations

in accordance with received signals under the control of a signal responsive device (not shown). Each of the permutation bars 11 have differently arranged on the front or left hand edges thereof as shown in Fig. 1, a series of notches and for each combination of settings of the permutation bars a notch in each of the bars 11 is in alignment with a notch in each of the others. Disposed to the front of the permutation bars 11 and adapted to cooperate with the notches therein, are a plurality of substantially vertical drop-in-bars 12. The drop-in-bars are pivotally supported at their lower ends on a common pivot rod 13 and are urged toward the permutation bars by means of individually attached springs 14. The drop-in-bars are normally held out of engagement with the permutation bars 11 by means of a bail 16 and following the selective positioning of the permutation bars 11 in response to a signal combination, a cam (not shown) on the main operating shaft 17 which is adapted to make one revolution in conjunction with each received code combination, operates the bail 16 to permit the drop-in-bars 12 to approach and engage the permutation bars 11. The drop-in-bar 12 opposite the aligned row of vertical notches in the permutation bars 11 is allowed to pivot a slight amount further than the rest to a selected position by entering the aligned row of notches. The upper end of the thus selected drop-in-bar 12 engages the lower left hand edge of an associated depending hook 18 to cause the lower hooked end thereof to be pivoted beneath an operating bail 19. Each hook 18 is pivotally attached at its upper end to an associated operating lever, the operating levers being indicated in general by reference numerals 21*a* to 21*c*, Figs. 1 and 2. The operating bail 19 is controlled by a cam 22 on the operating shaft 17 and on the operation thereof engages the operated hook of one of the operating levers 21*a* to 21*c* to cause a printing operation or a printer function to be performed, depending on which one of the hooks 18 is moved into the path of the operating bail 19.

The typebar operating levers, of which there are a number, one for each of the typebars 23, are indicated in general by reference numeral 21*a* and these bars pivot about their right hand end as seen in Fig. 1 when their associated hook 18 is engaged and operated by the operating bail 19. Extending transversely beneath the typebar operating levers 21*a* and adjacent the center thereof is a spacing bail 24 which is adapted to be operated on the operation of a typebar operating lever 21*a* which through a depending arm 26 controls the operation of a platen carriage spacing mechanism indicated in general by reference numeral 25. The platen carriage spacing mechanism operates on the return of the operating bail 19 to normal, to space the platen carriage 10 one letter space in a letter spacing direction in conjunction with each printing operation. A single operating lever similar to the typebar operating levers 21*a* has no typebar associated therewith and its operation only causes the operations of the letter spacing mechanism 25 for word spacing.

The platen carriage 10 is supported in a carriage cradle which is raised and lowered in response to shift and unshift signals respectively, to enable the printing of either one or the other of the two characters on the free ends of the typebars 23. The lever 21*b*, Figs. 1, 2 and 3, hereinafter referred to as the shift operating lever, causes the carriage cradle to be raised or shifted to a shift position when its associated hook 18 is operated by the operating bail 19. This lever 21*b* is pivoted adjacent its center on a pin 27 in a stationary part of the printer frame and the right hand end thereof engages a plate 28 on the movable section of the carriage cradle to raise the carriage when this lever is operated. After the carriage cradle is raised, a spring 29, Fig. 2, pivots a latching member 31 to allow a shoulder 32 thereon to be moved under a pin 33 in the movable part of the carriage cradle and thus prevents the carriage from returning to its lower or unshift position on the return of the shift operating lever 21*b* to its normal position. Another operating lever 21*c*, hereinafter referred to as the unshift operating lever, is adapted, when operated, to pivot a bell crank 34 which through a link 35 causes the withdrawal of the latching member 31 from engagement with the pin 33. Thereupon the weight of the carriage causes it to move to its lower position. The lever 21*c* is selected in response to an unshift signal. For obvious reasons the operating levers 21*b* and 21*c* are not adapted to operate the spacing bail 24 and therefore the platen 10 is not letter spaced on shift and unshift operations in response to shift and unshift signal code combinations.

The type bars 23 have the characters on the free ends thereof and printing of the characters is effected through the inking ribbon 36, Figs. 1 and 3. The inking ribbon 36 is of the usual pre-inked type and is fed and wound up on spools, reels or bobbins such as 37. The spools are mounted on vertical pins supported by a stationary part of the frame and hence, as is the usual practice in ordinary typewriters, do not move to and fro with the platen carriage 10. The ribbon 36 in passing from one bobbin to the other is threaded through a shuttle 38 located in the printing plane. One spool serves as a supply spool while the other serves as a take-up spool and the direction of movement of the ribbon reverses automatically when the ribbon is nearly all unwound from the spool 37 which happens to be serving as the supply spool. Normally the shuttle 38 is in a lowered position and raises the ribbon 36 in conjunction with the operation of a type bar to provide visible printing as in an ordinary typewriter.

For obvious reasons it is necessary to have a slight clearance between the inking ribbon shuttle and the printing platen 39 and hence on a printing operation the operated type bar has to move the ribbon a slight amount to engage the recording paper supported on the recording platen. With the printer recording with the platen carriage 10 in one shift position, such as the unshift, the inking ribbon 36 normally has sufficient slack therein to offer little or no resistance to the movement of the type bar in moving the ribbon into engagement with the recording platen 39. However, the carriage cradle in moving from one shift position to another does not move in a vertical plane but in a plane inclined appreciably from the vertical, in moving from its unshift to its shift position moves away from the stationary mounted supply and take-up spools 37. Accordingly the shuttle 38 moving with the carriage cradle 10 tightens up or creates an abnormal tension in the inking ribbon as the platen cradle thus moves. The manner in which the abnormal tension or tightness in the inking ribbon normally adversely

effects the printing operations following the movement of the platen carriage 10 into its unshift position will be pointed out hereinafter.

As pointed out hereinbefore, the printing operation is performed by a bail 19 operated from a spring 41 as controlled by the operating cam 22. As the same spring 41 is effective to operate each of the type bars individually, the force actuating the same is substantially uniform. Also, the bail 19 is so arranged that in performing a printing operation the last part of the movement of a type bar 23 is due to the inertia, or over-throw thereof. The type bars 23 are all substantially of the same weight and hence all would ordinarily strike the recording platen 39 with the same force. However, when the inking ribbon 36 is abnormally tight a considerable portion of the inertia of a type bar 23 is absorbed in loosening the inking ribbon and moving the same into contact with the recording paper on the platen 39. Where some of the inertia of the type bar is absorbed in loosening the inking ribbon, the type bar strikes the platen with less of a blow than it would if the inking ribbon had its usual looseness. The force with which the type bar strikes the recording paper determines the lightness and heaviness of the recorded character, and where part of the type bar inertia is absorbed by the inking ribbon the recorded character will appear lighter than those characters recorded with a loose inking ribbon. Such operation of a printer is very unsatisfactory and in extreme cases may result in that the type bars operating immediately following the shift operation may fail to record entirely. With a tight inking ribbon the type bars also tend to cut the inking ribbon and shorten its usefulness resulting in higher maintenance costs.

In accordance with the invention an arrangement is provided whereby concomitantly with the movement of the platen carriage away from the inking ribbon supply spools, or from an unshift to a shift position, the inking ribbon is loosened and therefore has no abnormal tension or tightness therein following such an operation or movement of the platen carriage 10. The movement of the platen carriage from its shift to unshift position is accomplished as hereinbefore pointed out by the pivoting of the shift lever 21b in a counterclockwise direction. To loosen the inking ribbon on a shift operation a lever or arm 42 is clamped by a clamping screw 43 to the shift lever 21b at the left of the pivot pin 27 with the free or upper end thereof, as shown in Figs. 1 and 3, in back of the inking ribbon 36. The arm 42 moves with the shift lever 21b and in moving the upper end thereof engages the inking ribbon 36 to form a bend or slight loop therein and causes a slight amount of ribbon to be unrolled from the bobbin which at this time happens to be serving as a supply spool. The amount of ribbon unwound from the supply spool compensates for the distance the shuttel moves away from the supply and take-up bobbins 37 and hence as the shift lever 21b and the arm 42 subsequently return to their normal positions the tension in the inking ribbon 36 is substantially the same as it was prior to the operation of the shift lever 21b, the operation of which moves the platen carriage cradle 10 from its unshift to its shift position. With the same tension existing in the inking ribbon both prior to and following a shift operation, no abnormal portion of the inertia of an operated type bar 23 is absorbed in loosening the inking ribbon, and accordingly characters recorded following the shift function are recorded with substantially the same blow on the recording paper as those preceding the shift function. In addition the inking ribbon with no abnormal tension therein is less likely to be cut by the type bars and will wear better.

Another feature of the invention resides in the adjustability of the arm 42 along the shift lever 21b, and by varying the position of the arm 42 along the lever 21b, variable amounts of the ribbon may be unwound from the supply spool on a shift operation. Thus by adjusting the position of the arm 42 on the lever 21b the amount of ribbon unwound from the supply spool can be made to compensate exactly for all practical purposes with the amount taken up by the platen carriage in moving away from the stationary ribbon bobbins on a shift operation.

It is obvious, of course, that various modifications of the invention shown and described herein may be made without departing from the spirit or essential attributes thereof, and it is desired therefore, that only such limitations be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

What is claimed is:

1. In a printing mechanism, an inking ribbon, supply and take-up reels for said ribbon, a platen carriage movable from an unshift position to a shift position away from said supply and take-up reels, an inking ribbon guide movable with said platen carriage and means engaging said ribbon for unreeling the same from the supply one of said reels to provide at least a predetermined amount of slack therein following the operation of said means concomitantly with the movement of said platen carriage away from said supply and take-up reels.

2. In a printing apparatus, an inking ribbon, supply and take-up reels for said ribbon, a platen carriage movable from an unshift position to a shift position away from said supply and take-up reels, an inking ribbon guide movable with said platen carriage, a shift operating lever for moving said platen carriage from said unshift to said shift position, and means operative with said shift operating lever and engaging said ribbon between said ribbon guide and one of said reels for unreeling at least a predetermined amount of said ribbon from said supply reel on the shift operation of said platen carriage.

3. In a printing mechanism, an inking ribbon, supply and take-up reels for said ribbon, a platen carriage movable from an unshift position to a shift position away from said supply and take-up reels, an inking ribbon guide for guiding said inking ribbon between said take-up and supply reels and movable with said platen carriage, said inking ribbon normally having not more than a predetermined tension therein, a shift operating lever for moving said platen carriage from said unshift to said shift position, means operative with said shift operating lever and engaging said inking ribbon for unreeling an amount of said ribbon from said supply reel on the shift operation of said platen carriage and means for varying the amount of said ribbon unreeled from said supply reel on the shift operation of said platen carriage.

4. In a printing machine, an inking ribbon of extended length, supply and take-up reels for said inking ribbon, a platen carriage movable from said unshift position to a shift position

away from said supply and take-up reels, an inking ribbon guide movable with said platen carriage for guiding said inking ribbon adjacent said platen carriage, shift operating means, a member adapted to unreel inking ribbon from the supply reel on each operation thereof and means including said shift operating means for operating said member whereby substantially equal tensions are maintained in said ribbon both preceding and following a shift operation of said platen carriage in which the latter moves away from said inking ribbon supply and take-up reels.

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