

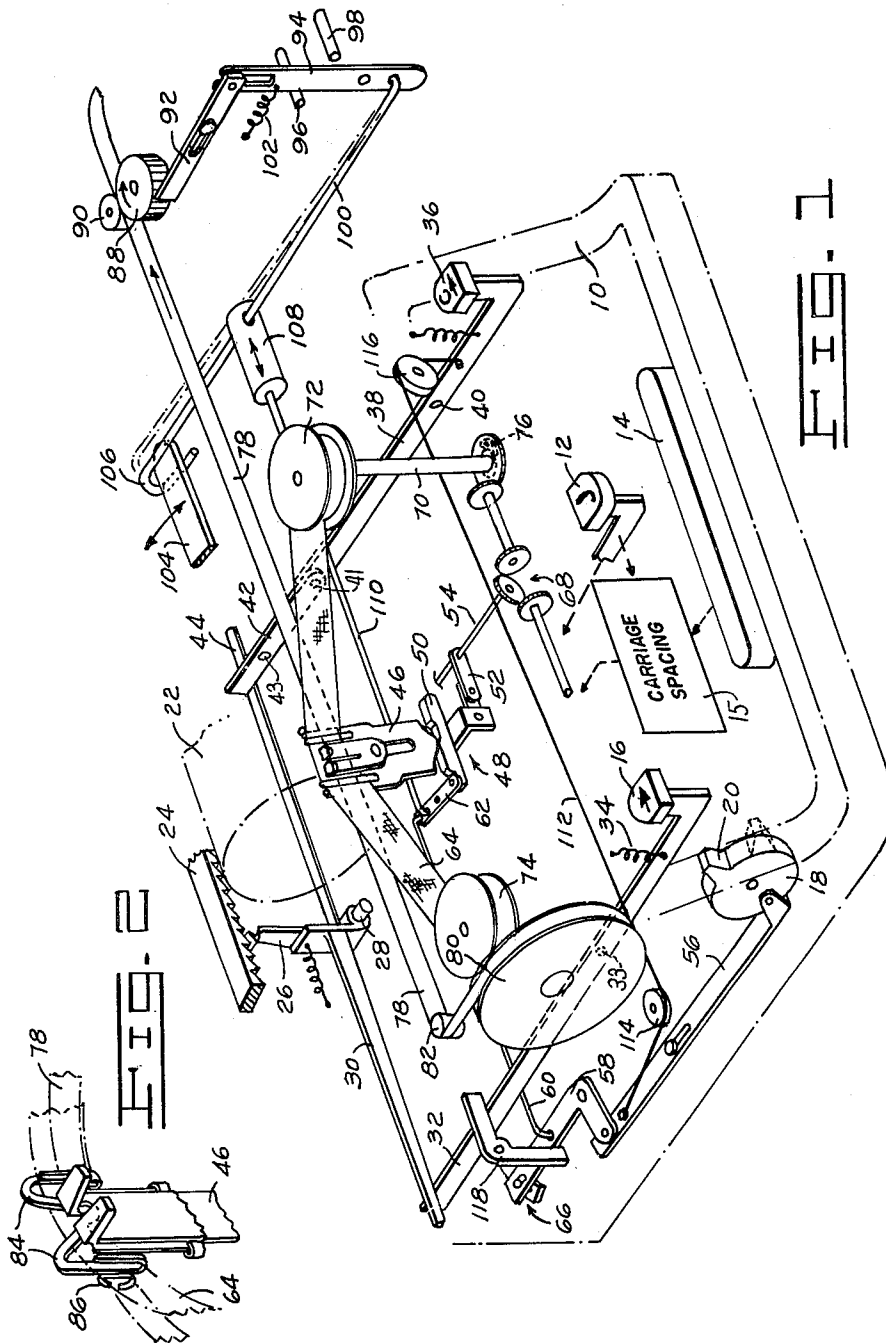
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ERROR-CORRECTING TYPEWRITER

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ERROR-CORRECTING TYPEWRITER
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This invention pertains to typewriters and similar business machines, and aims to provide an arrangement to facilitate the correcting of erroneously printed or typed characters. It is common practice to correct erroneous imprints by the use of a transfer material which superimposes on the erroneous imprint a layer of opaque pigment, usually white to match the color of the impression paper, the pigment being carried on a support strip of paper or the like, and so formulated as to be transferred to the impression sheet by the impact of a type bar or bars of the machine. This correction material is usually manually held by the typist at a point between the erroneous imprint and the ordinary inking ribbon of the typewriter, with its pigment surface facing the impression paper. The paper carriage or printing mechanism having been moved (as by backspacing) to bring the erroneous imprint into impression position, the erroneous character is again struck, so that a layer of pigment corresponding to the shape of the erroneous character is deposited to obliterate that character. If a correct character is to be superimposed on the obliterated space or spaces, the typist, after withdrawing the correction material, again backspaces to the desired point and makes the correct impressions in the usual way by means of the inked ribbon.

The above procedure involves considerable manipulation on the part of the typist, who has to obtain and position the correction material (in a vision-obscuring position) by hand, as well as observing the proper sequence of keyboard actions, backspacing and the like. It has also been proposed to effect corrections by means of a special ribbon which has parallel inking and obliterating stripes, so that the obliterating transfer material can be brought into use by shifting the "red-black-stencil" ribbon field control which is a common feature of such typewriters. A further development in the art has been the provision of a typewriter especially modified for convenient use of composite printing-correcting ribbons of the kind just mentioned; e.g., by providing an extra backspace key for use when an error is to be corrected, and connecting both backspace keys to the ribbon-field control so as automatically to shift the latter in the proper sequence for error obliterating and printing operations.

The present invention provides a typewriter or like machine in which the rapid and efficient correction of errors is greatly facilitated, and which does not depend upon the use of special composite ribbons which are relatively costly and not always conveniently available. Briefly, the usual ribbon vibrator is modified so as to carry not only a full-width printing ribbon of the usual type, but also to provide a guideway for a continuous strip of the correction material, positioning the latter so as to lie in a plane between the impression paper and the conventional ribbon. This continuous strip of correction material is carried on a separate reel within the typewriter or attached to it, and the correction material is provided with a separate stepwise feeding means operated to pull a fresh section of the material into position for each stroke of the type bars during the correction of errors. The feeding means for the correction material is therefore arranged to be selectively engaged only when the typist has operated the auxiliary or "special" backspace key that is provided for use in error correction as described above. Also, of course, the machine is arranged so that when the conventional backspace key has been operated one or more times (after one or more

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obliterating operations) to make correct imprints, the feed for the correction material will be disengaged, and the ribbon field control selector automatically restored to the "printing" condition. It may be noted that the proper amount of feed of the correction material may be different from that provided for an impregnated fabric printing ribbon.

The foregoing arrangement provides a number of advantages. A fresh area of correction material is always presented precisely at the necessary position for use. The amount of correction material used up is kept to a minimum, with no waste. Since the correction material strip is separated from the type face by the cushioning thickness of the conventional ribbon, the deposit of pigment over each error is somewhat broader than the erroneous imprint, to give more perfect obliteration; in other words, the "white" deposit, while conforming to the particular character being obliterated, corresponds to a bold-face imprint from the same type face. As compared with the use of composite ribbons which have only half the ink storage capacity of a full-width inked textile ribbon, the new arrangement provides a full-width ink storage medium where the inking ribbon is of conventional saturated fabric construction. Since the correction material, once used, will be discarded, it need not be reeled up after use, but may be allowed to issue from the typewriter to be torn off or disposed of as required.

A preferred embodiment of the invention will be described in detail herein, by way of illustration and not for purposes of limiting the invention. In the accompanying drawings,

FIG. 1 is a schematic perspective view, partly broken away and with conventional elements omitted for clarity, of a typical form of typewriter incorporating the invention.

FIG. 2 is an enlarged fragmentary perspective view showing the construction of the ribbon vibrator of the typewriter of FIG. 1.

The invention is shown, in FIGS. 1 and 2, as applied to a well-known make of commercial typewriter known as the "Everest," but parts of that machine which are conventional and do not contribute directly to the essentials of the present invention have been omitted or indicated schematically. Thus, numeral 10 designates the frame or chassis of such a typewriter, the usual key-bank area being provided with manually operable keys for the production of character imprints such as for the letter "J" at 12, the space bar as at 14, conventional carriage-spacing mechanism 15, the usual backspace key 16 for producing letter-width stepwise movements of the carriage and platen from left to right, and the usual control 18 for allowing the operator to select the ribbon-field to be used; normally, either red or black. The latter control, in the "Everest" machine, is in the form of a disc-like part having an operating lug 20 projecting through a slot in the side-frame portion of the machine.

The usual movable paper carriage of the typewriter has not been shown, and is to be understood as conventional, but its paper platen or roller has been shown partially, in dash lines, as at 22; the backspace rack 24, secured to the traveling carriage, cooperates with a backspacing pawl mechanism 26 to provide the desired stepwise backspace motion upon each depression of the backspace key 16. To this end, the pawl mechanism is mounted for rotation on a shaft 28, and has a lever 30 extending to a point at which its tip may be slightly elevated upon each rotation of the backspace keylever 32, which is pivoted at 33 intermediate its ends on a fixed part of the machine frame. The usual keylever restoring spring is indicated at 34.

A similar stepwise backspacing movement of the pawl mechanism 26 is produced whenever the auxiliary back-

spacing key 36, at the opposite end of the keybank, is depressed. The keylever 38 of key 36 is also pivoted intermediate its ends as at 40, and at its rear end is pivoted at 41 to a transfer lever 42 pivoted at 43, and whose tip rests above the end of a rod or the like 44, also secured to the pawl mechanism 26. This second or "auxiliary" backspacing key is the one intended for use in backspacing as a preliminary to effecting an obliterating operation for error corrections.

The typewriter illustrated has the usual vertically-movable ribbon carrier or "vibrator" 46 which moves upward under the control of a universal bar operated when any character key such as 12 is operated. To provide this action, as well as to permit the selection of the particular ribbon field or stripe which is thus brought into printing position for each printing operation, the typewriter is provided with conventional vibrating mechanism 48. By way of illustration only, this is shown as including a stepped cam 50 positioned to engage the lower extremity of the vibrator 46 upon each actuation of the universal bar, this cam being interposed between the vibrator and the operating link 52 which is oscillated by the universal bar through a rock shaft 54. The extent to which the ribbon vibrator, and hence the ribbon carried therein, is lifted in preparation for each imprint, is controlled by the ribbon field selector 18. Thus, the selector is arranged to oscillate a sliding bar 56 in the fore-and-aft direction, the rear end of bar 56 being pivoted to a horizontal bell crank lever 58 pivoted on the frame, and connected by a link or wire 60 to a transfer lever 62 that is in turn connected to the sliding stepped cam 50.

The position of control 18 thus locates the stepped cam 50 to determine the extent of rise of the vibrator on each operation of shaft 54. Ordinarily, for use with a red and black ribbon, the lower stripe of the ribbon 64 would be inked red, and the upper stripe black. An intermediate position of control 18 may be used to eliminate the vibrator motion, as for stencil cutting, but in any case the selected position of control 18 is maintained by a spring detent arrangement 66. However, for use in connection with this invention, the ribbon 64 will normally be solid black or other solid-color inked, to provide the maximum ink reservoir for long printing life.

The ribbon 64 is drawn through the vibrator 46 in increments, as well known in the art, as by gearing 68 or the like connected to the rock shaft 54 and thence connected to drive gears for the respective shafts (one being shown at 70) for the conventional ribbon spools 72 and 74 between which printing ribbon 64 is reeled back and forth in the known way. Any known or convenient drive for these reels or spools is provided, preferably one of the automatic reversing type. By way of illustration, the connection to shaft 70 is indicated by the dash-line ratchet mechanism 76.

According to the invention, the same ribbon vibrator which carries and elevates the fabric inking ribbon 64 also guides a strip 78 of error-obliterating transfer material, such as a paper strip coated on the side facing the platen 22 with a layer of pressure-transferrable opaque pigment, usually white to match white impression paper. The vibrator is constructed so that this paper strip 78 is always positioned between the platen and the lower half (say) of the fabric ribbon 64, thus moving up and down as the character keys are struck, in the same manner. However, this strip 78 will only move to the actual printing position (that is, when the vibrator is set to reach its highest position) when the ribbon selector 18 has been moved to what would be the "red" printing position when the machine is employed with a red and black ribbon. This "red" position is indicated by the full-line position of lug 20, and the "black" position by its dashed line position.

The strip 78 of correction material is stored on a reel

or spool 80 suitably journaled in the machine, and is guided to the vibrator by the usual guides or rollers such as at 82. FIG. 2 shows the vibrator in more detail, the ribbon 64 passing through the usual full-width loops 84, while the strip 78 is carried by the auxiliary loops such as 86 (only one being visible) which are welded or otherwise secured to or formed as part of the vibrator for movement therewith. Upon leaving vibrator 46, the strip 78 passes to the right in FIG. 1, and through stepwise feeding mechanism indicated by a toothed feed roll 88 and the backing or pressure roller 90, and thence (for example) through a slot in the frame for removal by the typist as required.

It is desired that correction material 78 pass through the vibrator only when the machine is set for the making of corrections, to avoid waste. The feed is produced by reciprocations of a sliding bar 92 suitably mounted on the machine, and arranged to be reciprocated by the oscillations of a lever 94 between stops 96, 98 under the control of a link wire 100. A spring 102 serves to urge the lever in one direction, and link 100 intermittently oscillates it when the link is pulled rearwardly by an operating arm 104 which is permanently connected to the universal bar action. To enable this feeding of strip 78 to occur only when the ribbon field selector 18 is set for "red" (or "erase" in this invention), the link wire 100 is arranged to be moved sidewise so that its loop 106 can either engage, or not engage, the arm 104. To this end, the link wire 100 passes loosely through a hole in an enlarged end 108 of a wire or rod 110 mounted for limited sliding motion on the machine frame, and connected also to the transfer lever 62 of the vibrator mechanism.

Thus, when the ribbon field control 18 is in the "red" or erase position, as shown, rod 110 will be at its maximum leftward position, and its loop 106 will be in position to engage the end of arm 104, to be pulled rearwardly thereby as each character key is operated, thus accomplishing the stepped feed of material 78 through the vibrator. In any other position of control 18, rod 110 will be shifted to the right by lever 62, moving the link wire 100 so that its loop 106 will be past the end of arm 104, as shown in dotted lines, to interrupt the feed of the correction strip.

When the printing ribbon 64 of the machine is of the saturated fabric type intended for constant re-use, the reels 72 and 74 will reverse their direction of rotation automatically, in the known way, as the ribbon approaches each end point, as described above; it is then immaterial that the ribbon feed provided by gearing 68 and ratchet 76 will continue to operate while corrections are being made and strip 78 used up. However, when employed with one-use carbon paper or plastic film ribbons in place of ribbon 64, unnecessary waste of such material may be avoided by selectively disconnecting the feeding action of such gears 68 whenever the feed for correction material is engaged. The mechanism employed may be similar to that providing for disengagement of the feed of strip 78.

Preferably, sliding bar 92 in its rest position rests against feed roll 88, to positively prevent accidental back-feed of the correction strip even if it should be subjected to contact with ribbon 64, in the vibrator, while the ribbon 64 is traveling in the left-wise direction. The friction of guide 82 and of the mount for spool 80 similarly prevents unintended forward-feed of strip 78, and holds it taut between periods of use.

The present invention also incorporates means by which the ribbon field selecting control 18, and the selective feeding of strip 78, are controlled by the choice of the particular backspace key which is employed at each phase of a correction operation. Thus, the detented slide bar 56 of the field control is connected as by a cable or cord 112 passing over guide rollers such as 114 and 116 to the auxiliary backspace keylever 38. When

the auxiliary backspace key 36 is depressed, therefore, the ribbon field control will be shifted to its "red" or "erasing" position, and will remain in that position for successive depressions of backspace key 36. When the incorrect characters have been overprinted with the white correction material from strip 78, the normal backspace key 16 will be operated one or more times in preparation for printing the correct character or characters, and the first such depression of key 16 will raise the rear end of keylever 32, also rotating the vertical bell crank lever 118 and causing its depending end to engage and move the horizontal bell crank 58 clockwise as viewed from above, restoring the slide bar 56 and control 18 to the "black" or "printing" position. The selective control of the feeding action of the correction material is simultaneously effected in the manner already described.

While the invention has been described herein in connection with a preferred embodiment, it is intended to include within the invention all variations of these details which fall within the scope of the appended claims.

I claim:

1. An error correcting typewriter comprising character-printing mechanism including printing control keys; a paper support mechanism; spacing means for stepwise moving said mechanisms relative to one another in a forward direction in response to operation of said keys to accomplish printing of a line of characters; ribbon vibrator means actuated by the printing control keys to bring a ribbon field momentarily into operative position upon actuation of each of said printing control keys; a printing ribbon and a print-obliterating ribbon carried by said vibrator means for selective presentation in impressing position; ribbon field-selecting means for controlling the motion of the vibrator means to select the particular ribbon that is thus brought into impressing position; backspace drive means for stepwise moving said mechanisms relative to one another in the backward direction in letter-width increments; a pair of backspace keys both connected to operate said backspace drive means; connections between said backspace keys and said field-selecting means; operable to shift the field-selecting means between positions respectively corresponding to that backspace key which was last operated; means for feeding said printing ribbon through said vibrator mechanism upon each operation of said printing control keys; means for feeding said print-obliterating ribbon through said vibrator mechanism upon each operation of said printing control keys; and means controlled by said ribbon field-selecting means for selectively disabling the feeding means for one of said ribbons.

2. An error correcting typewriter comprising character-printing mechanism including printing control keys; a paper support mechanism; spacing means for stepwise moving said mechanisms relative to one another in a forward direction in response to operation of said keys to accomplish printing of a line of characters; ribbon guide means adjustable to bring a selected ribbon field into impression position; a printing ribbon and a print-obliterating ribbon carried by said guide means for selective presentation in impressing position; backspace drive means for stepwise moving said mechanisms relative to

one another in the backward direction in letter-width increments; a pair of backspace keys both connected to operate said backspace drive means; connections between said backspace keys and said ribbon guide means and operable to adjust the latter to bring into impression position a selected one of said ribbons in accordance with which of said backspace keys was last operated; means for feeding said printing ribbon through said guide means upon each operation of said printing control keys; means for feeding said print-obliterating ribbon through said guide means upon each operation of said printing control keys; and means controlled by one of said backspace keys for selectively disabling the feeding means for one of said ribbons.

3. An error correcting typewriter comprising character-printing mechanism including printing control keys; a paper support mechanism; spacing means for stepwise moving said mechanisms relative to one another in a forward direction in response to operation of said keys to accomplish printing of a line of characters; ribbon guide means adjustable to bring a selected ribbon field into impression position; a printing ribbon and a print-obliterating ribbon carried by said guide means for selective presentation in impressing position; backspace drive means for stepwise moving said mechanisms relative to one another in the backward direction in letter-width increments; a pair of backspace keys both connected to operate said backspace drive means; and connections between said backspace keys and said ribbon guide means and operable to adjust the latter to bring into impression position a selected one of said ribbons in accordance with which of said backspace keys was last operated.

4. An error correcting typewriter comprising character-printing mechanism including printing control keys; a paper support mechanism; spacing means for stepwise moving said mechanisms relative to one another in a forward direction in response to operation of said keys to accomplish printing of a line of characters; ribbon guide means adjustable to bring a selected ribbon field into impression position; a wide printing ribbon and a narrow print-obliterating ribbon carried by said guide means with said narrow ribbon overlapping a portion of said wide ribbon between the latter and said paper support mechanism, for selective presentation in impressing position; backspace drive means for stepwise moving said mechanisms relative to one another in the backward direction in letter-width increments; a pair of backspace keys both connected to operate said backspace drive means; and connections between said backspace keys and said ribbon guide means and operable to adjust the latter to bring into impression position a selected one of said ribbons in accordance with which of said backspace keys was last operated.

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