United States Patent [19]

Vartanian, Jr. et al.

[11] **3,788,441**

[45] **Jan. 29, 1974**

[54] **EDITING TYPEWRITER WITH CORRESPONDING MOTION OF RECORDER ELEMENTS**

[75] Inventors: **Perry H. Vartanian, Jr.,** Woodside; **Michael J. Markakis; Carl P. Anderson,** both of Palo Alto, all of Calif.

[73] Assignee: **SCM Corporation,** New York, N.Y.

[22] Filed: **Apr. 26, 1971**

[21] Appl. No.: **137,165**

[52] **U.S. Cl.** ..... **197/1 R,** 197/16, 197/127 R, 197/135 A, 197/138 R

[51] **Int. Cl.** **B41j**

[58] **Field of Search** ..... 197/1 R, 16, 135 A, 138 R, 197/127; 340/174 R, 174.1 R; 346/74 R, 74 M, 74 MP

[56] **References Cited**

UNITED STATES PATENTS

2,848,088	8/1958	Shaw	197/1 R
3,164,836	1/1965	Crosman	197/1 R UX
3,014,569	12/1961	Palmer	197/16
1,219,598	3/1917	Smith	197/135 A
1,362,204	12/1920	Waldheim	197/138 R UX
2,258,106	10/1941	Bryce	197/1 R X
2,745,532	5/1956	Crawford	197/1 R
2,784,392	3/1957	Chaimowicz	197/1 R X
2,958,568	11/1960	Hagelbarger	197/1 R X
2,962,339	11/1960	Woo et al.	197/1 R X
3,045,218	7/1962	Brand	197/1 R X

FOREIGN PATENTS OR APPLICATIONS

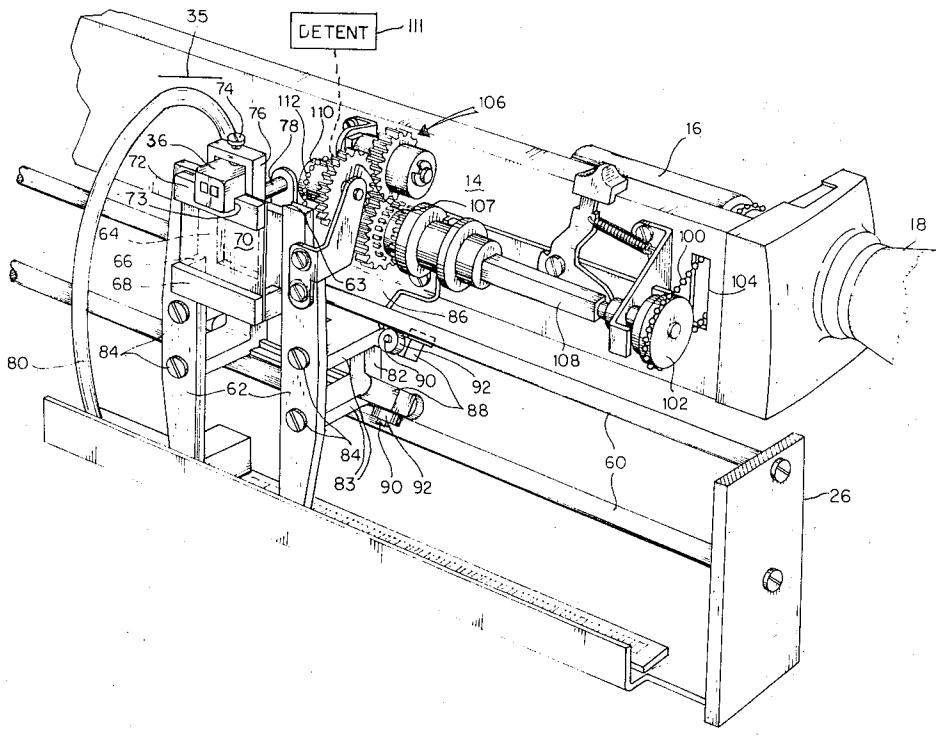
1,167,364	10/1969	Great Britain	197/1 R

Primary Examiner—Ernest T. Wright, Jr.
Attorney, Agent, or Firm—Robert B. Kennedy; M. M. Wolson; Armand G. Guibert

[57] **ABSTRACT**

A machine is disclosed for simultaneously making type-written and magnetic records, for editing magnetic records, and for automatically making typewritten record copies of edited or unedited magnetic records. The editing typewriter comprises typewriter elements including a platen and printing type spaced from the platen. Means are provided for moving the typewriter elements into and out of positions of mutual contact and for laterally stepping one of the typewriter elements with respect to the other. The editing typewriter also comprises magnetic recorder elements including a magnetic head and a magnetic record support. Structural means are provided "pantographically" linking one of the typewriter elements with one of the magnetic recorder elements whereby one of the magnetic recorder elements may be stepped with respect to the other of the magnetic recorder elements when one of the typewriter elements is laterally stepped with respect to the other of the typewriter elements.

11 Claims, 12 Drawing Figures



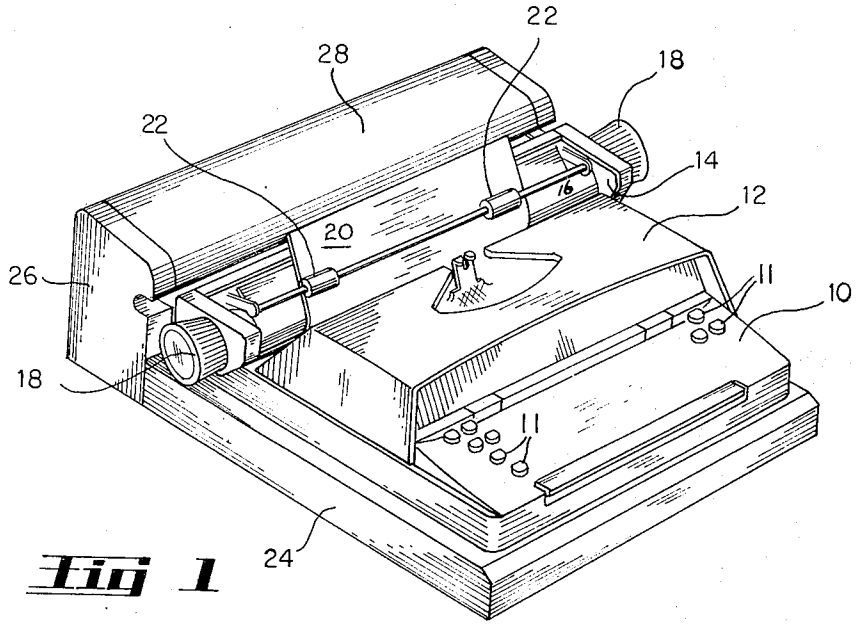


Fig 1

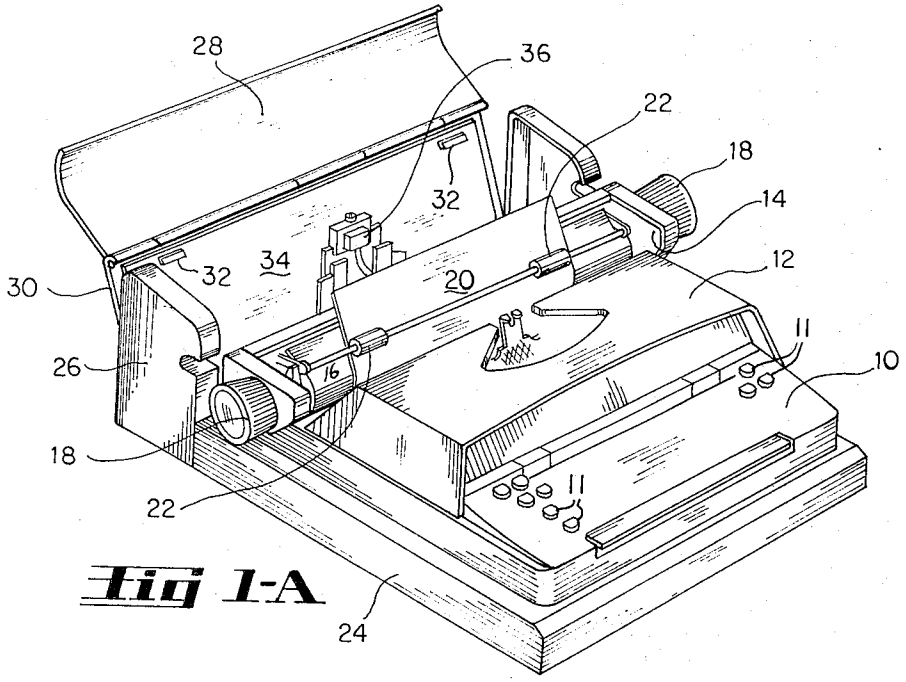


Fig 1-A

INVENTOR.
PERRY H. VARTANIAN JR.
MICHAEL J. MARKAKIS
BY CARL P. ANDERSON

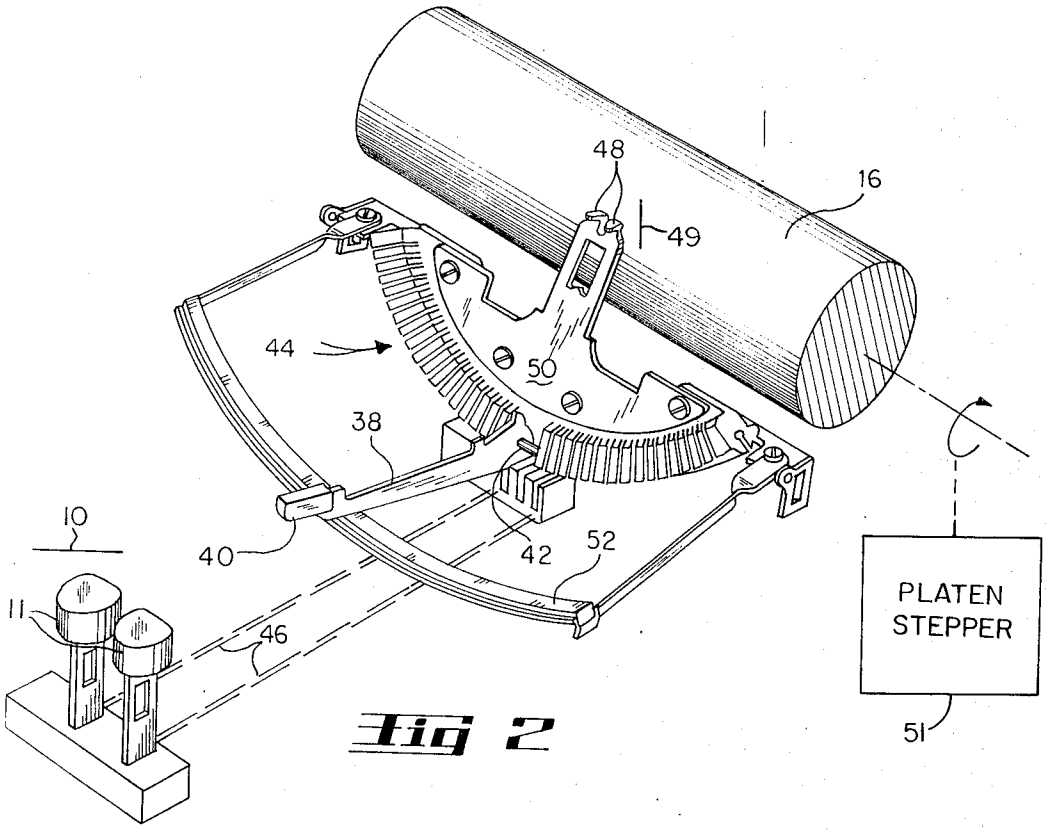


Fig 2

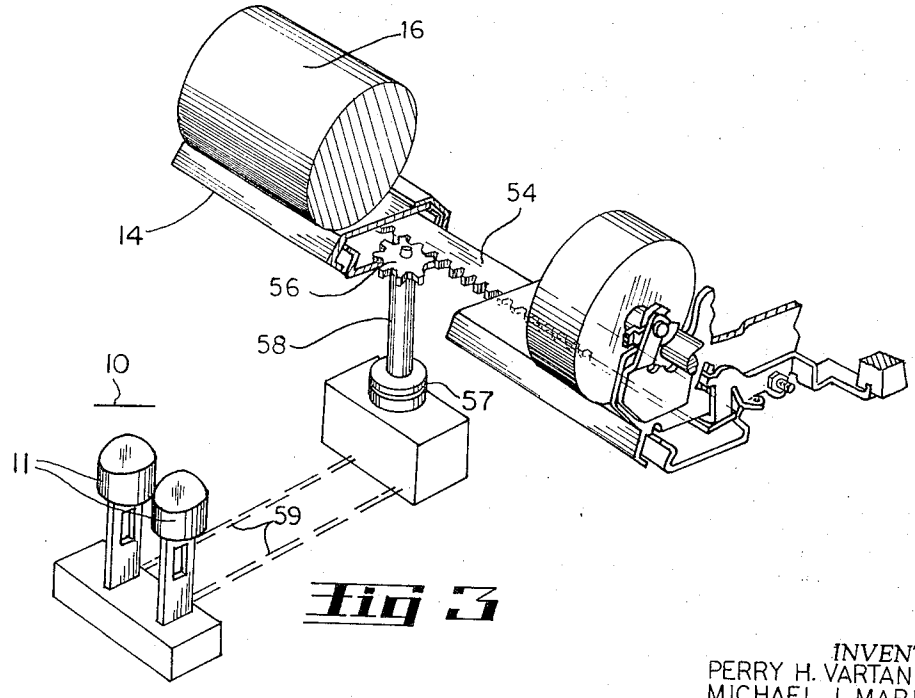


Fig 3

INVENTOR.
PERRY H. VARTANIAN JR.
MICHAEL J. MARKAKIS
BY CARL P. ANDERSON

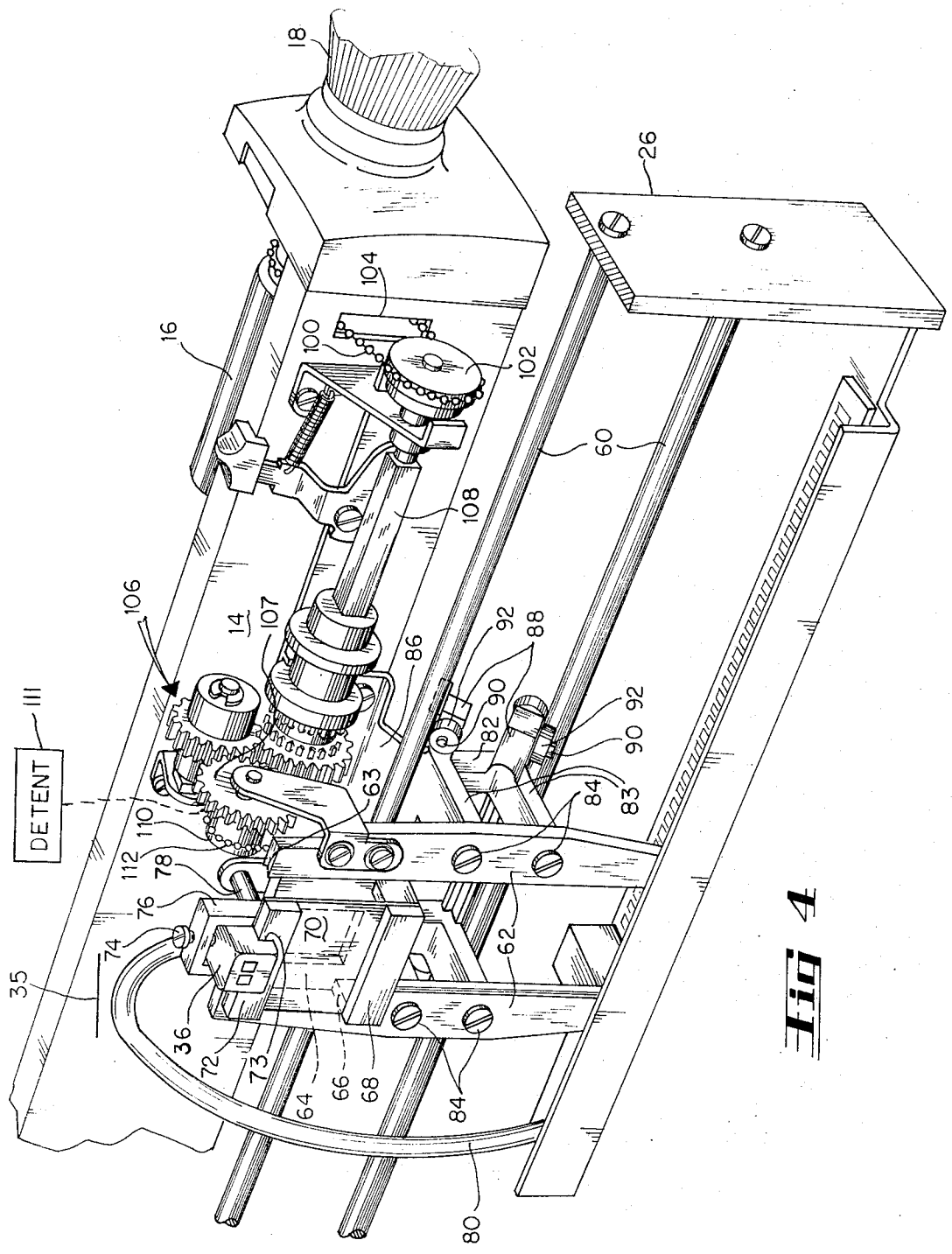


Fig 4

INVENTOR.
PERRY H. VARTANIAN JR.
MICHAEL J. MARKAKIS
CARL P. ANDERSON
BY

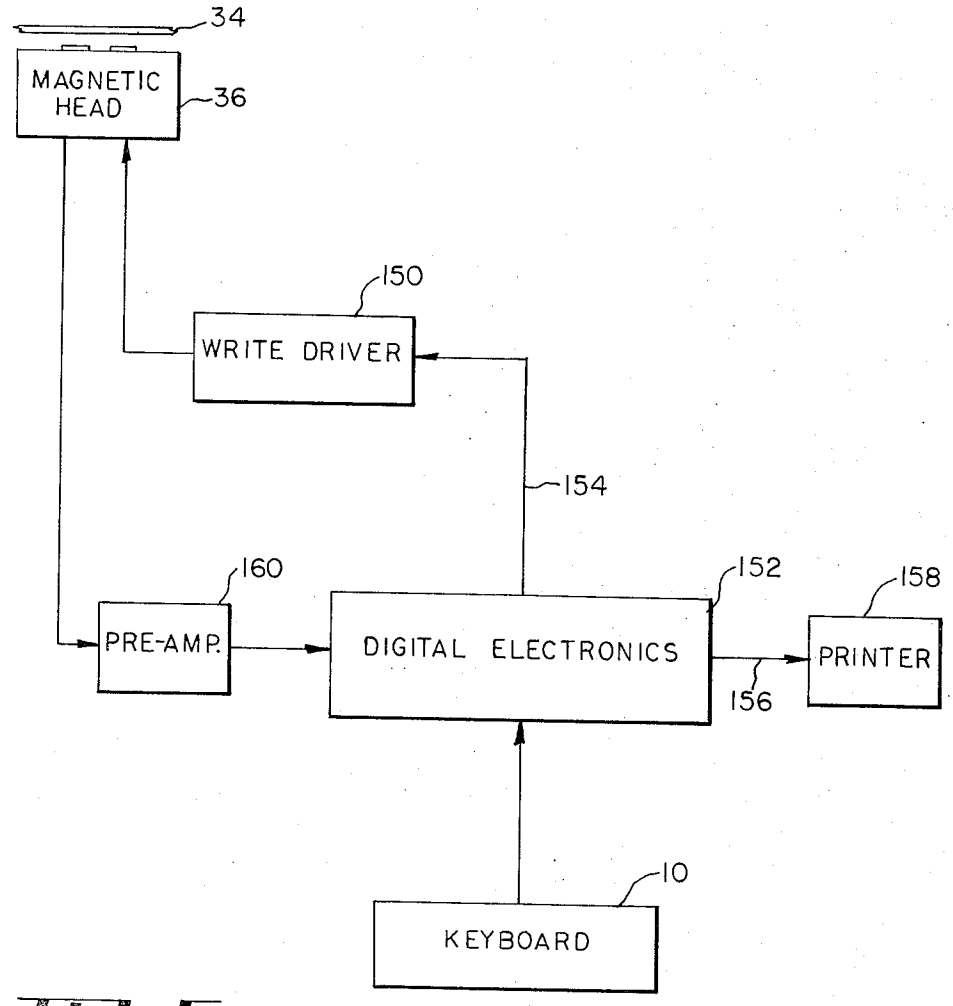


Fig 5

INVENTOR.
PERRY H. VARTANIAN JR.
MICHAEL J. MARKAKIS
BY CARL P. ANDERSON

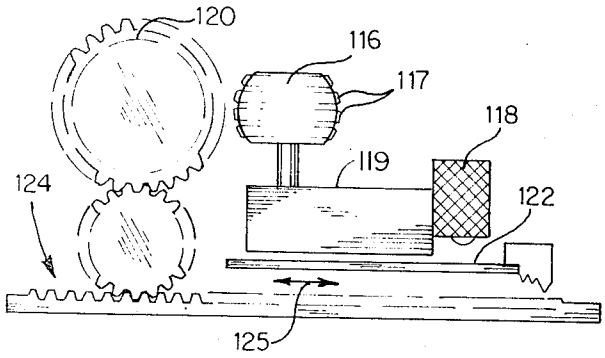


Fig 6

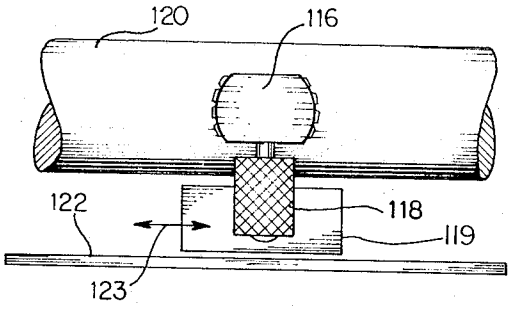


Fig 6A

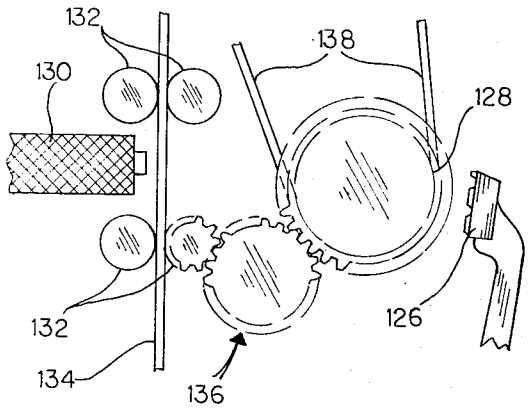


Fig 7

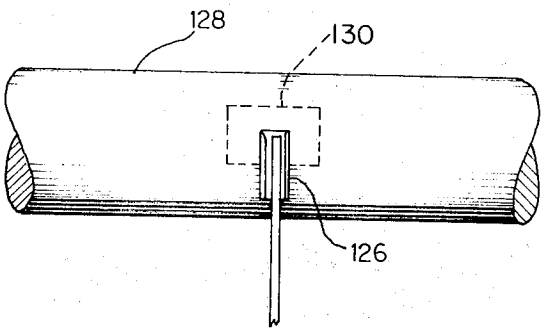


Fig 7A

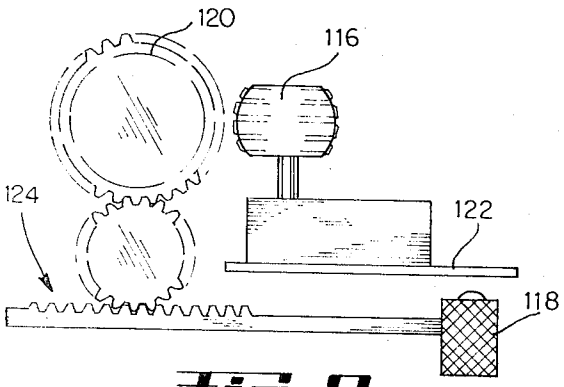


Fig 8

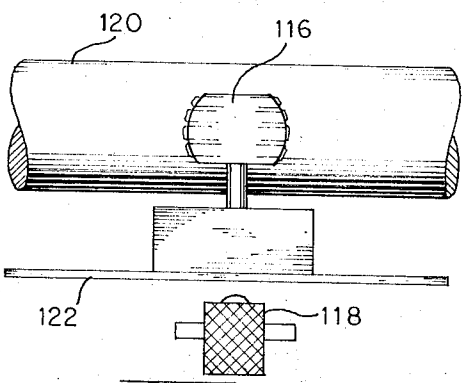


Fig 8A

INVENTOR.
PERRY H. VARTANIAN JR.
MICHAEL J. MARKAKIS
BY CARL P. ANDERSON

EDITING TYPEWRITER WITH CORRESPONDING MOTION OF RECORDER ELEMENTS

BACKGROUND OF THE INVENTION

This invention relates to editing typewriters which is to say machines capable of simultaneously making printed and magnetic records, and which ordinarily have the additional capability of editing magnetic records and of automatically making typewritten record copies of magnetic records in either their edited or unedited form.

Typewriters generally must have means for either laterally stepping a printable record past a typewriter printing station or of laterally stepping the printing station itself over a printable record in order to provide means for printing a succession of characters in forming horizontal lines of print. In addition, means ordinarily must also be provided for stepping the printable record vertically to provide means for printing a column of such lines thereon. Likewise, magnetic recorders must have means for providing lateral stepping and means for providing vertical stepping where the recorder is adapted to process magnetic records in the shape of cards as opposed to tapes.

Heretofore, the typewriting and magnetic recording portions of editing typewriters have typically been housed in two, structurally independent but electronically coupled units. With such arrangement each unit obviously must have its own drive means for record stepping plus means to synchronize the stepping action of each unit in master-slave fashion. This requirement has necessitated the transduction of typewriter carriage and magnetic head, has created a sacrifice in overall machine compactness, and has added generally to machine complexity and expense.

To date some advance in the art has been made in alleviating this problem. Exemplary of such is the machine disclosed by U.S. Pat. No. 2,874,369. Here the magnetic tape unit is supported directly from the fixed carriage runway of the typewriter unit. The magnetic tape is fed by movement of the typewriter carriage through a transmission system which, in this particular case, comprises a capstan, an adjustable clamp connected to a movable carriage, and a driving belt which passes through the clamp and over the capstan. While such arrangements do provide some improvement in compactness and do eliminate the need for transducing the typewriter carriage and magnetic head, machine complexity and expense generally remain.

Accordingly, it is an object of the present invention to provide an improved editing typewriter.

More specifically, it is an object of the present invention to provide an editing typewriter having improved drive means for stepping a magnetic head over the surface of a magnetic record.

Another object of the invention is to provide an editing typewriter having improved means for synchronizing the stepping of a magnetic head over the surface of a magnetic record with the relative stepping of the typewriter platen and printing type.

Another object of the invention is to provide an editing typewriter which does not require transduction of the typewriter carriage or magnetic head.

Other objects of the invention include providing an editing typewriter which is relatively compact, lacking

in complexity of certain drive mechanisms, and which is relatively inexpensive.

SUMMARY OF THE INVENTION

Briefly described, the present invention relates to an editing typewriter which comprises the ususal typewriter elements including a platen and printing type spaced from the platen, and the usual means for stepping one of said typewriter elements with respect to the other to effect character spacing within a line of type. According to the invention, the editing typewriter further comprises magnetic recorder elements including a magnetic head and a magnetic record support plus means for stepping one magnetic recorder element with respect to the other. Structural means are also provided which "pantographically" (defines linearly corresponding motion, as used herein) one of said typewriter elements with one of said magnetic recorder elements.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an editing typewriter incorporating principles of the present invention.

FIG. 1A is a persepctive view of the editing typewriter shown in FIG. 1 with the magnetic recorder housing disposed in an open position.

FIG. 2 is a perspective view of printing type elements of the editing typewriter shown in FIG. 1 with means shown schematically for actuating same.

FIG. 3 is a perspective view of a portion of the typewriter platen shown in FIG. 1 together with means for stepping it laterally with respect to the printing station.

FIG. 4 is a perspective view of elements of the magnetic recorder portion of the editing typewriter shown in FIG. 1.

FIG. 5 is a block diagram of principal, functional components of the editing typewriter shown in FIG. 1.

FIG. 6 is a diagrammatical side view of recording elements of another embodiment of an editing typewriter incorporating principles of the present invention. FIG. 6A is a diagrammatical front view of the elements shown in FIG. 6.

FIG. 7 is a diagrammatical side view of recording elements of another embodiment of an editing typewriter incorporating principles of the present invention. FIG. 7A is a diagrammatical front view of the elements shown in FIG. 7.

FIG. 8 is a diagrammatical side view of recording elements of yet another embodiment of an editing typewriter incorporating principles of the present invention. FIG. 8A is a diagrammatical front view of the elements shown in FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing there is shown in FIG. 1 a preferred embodiment of the present invention comprising a keyboard **10**, printing type cover **12**, a carriage **14**, a platen **16**, a pair of platen knobs **18**, and a printable record sheet **20** held to platen **16** by two bail rollers **22**. To the rear of typewriter frame **24** is secured a magnetic recorder housing **26**. As may be seen more clearly by reference to FIG. 1A the recorder housing **26** has a top cover **28** hinged on to card support backing plate **30** which in turn is rotatably mounted (not shown, but may be similar to the mounting of top cover **28**) to the bottom of recorder

housing 26. In this open position two card alignment tabs 32 are shown mounted to backing plate 30. A magnetic card 34 is held in alignment on the card support backing plate 30 by card indexing holes (not visible as such in FIG. 1A) through which tabs 32 fit in snug engagement, as seen in FIG. 1A. A read and write magnetic head 36 is also revealed in the open position of recorder housing 26 shown in FIG. 1A which head 36 may be moved laterally while closely adjacent to magnetic cards 34 when backing plate 30 is disposed in its closed position as shown in FIG. 1.

In FIG. 2 is shown an example of means for bringing printing type heads 40 (housed under type cover 12 in FIGS. 1, 1A) into printing position on a record sheet or document (20 in FIGS. 1,1*a* though not shown in FIG. 2) held by platen 16. It should, of course, be understood that the particular means here illustrated represent but one of many which have been widely known in typewriter art for many years. In addition, it should be appreciated that non-impact printing means such as a heating font may be substituted for impact printing type head 40 specifically shown here and that the phrase "printing type" is intended to include such herein.

Here in FIG. 2, one of a set of printing typebars 38 is shown having mounted on one end thereof a type head 40 with the usual character font. The typebars 38 are rotatably mounted on a typebar fulcrum wire 42 which in turn traverses typebar segmented frame 44. Each typebar 38 is electromechanically linked by well-Known transduction means to a key 11 in keyboard 10 as schematically represented by lines 46. Upon depression of a key 11 in keyboard 10 a typebar 38 so coupled thereto is caused to rotate on typebar fulcrum wire 42 in bellcrank fashion causing type head 40 secured to the end thereof to rotate clockwise. As type head 40 approaches platen 16 it passes between guide lips 48 of typeguide anvil assembly 50 and enters a printing station 49 where it will strike platen 16 or a printable record sheet 20 (not shown in FIG. 2) located thereon. Upon striking platen 16, typebar 38 rebounds and rotates counterclockwise about fulcrum wire 42 to its rest position on cushion 52. When necessary, the operator may move the record sheet (20 in FIGS. 1,1*a*) to a new line manually by knob 18 or by depression of an appropriate one of the keys 11 in fashion and by means well known in the typewriter art, shown schematically in FIG. 2 as "platen stepper" 51.

In FIG. 3 means are illustrated for stepping carriage 14 and platen 16 attached thereto past the aforementioned printing station 49 (not shown in FIG. 3). Such means include an escapement rack 54 mounted to the bottom of carriage 14 and pinion 56 rotatably mounted in engagement therewith. Pinion 56 is end mounted on shaft 58 which in turn is electromechanically coupled to the keys 11 of keyboard 10 by well-known transduction means as schematically illustrated by lines 59. Upon actuation of a key 11 pinion 56 will be caused to rotate, stepping escapement rack 54 a predetermined linear distance together with carriage 14 and platen 16 secured thereto. Upon carriage return, pinion 56 is either temporarily disengaged or caused to rotate freely by suitable clutch release means in fashion well known in the typewriter art and indicated generally as the disk 57. A more detailed explanation of such a stepping mechanism may be had by reference to U.S. Pat. No. 2,896,767.

In FIG. 4 the magnetic recorder is shown to comprise two vertically-spaced cylindrical guide rails 60 rigidly mounted on the sides of recorder housing 26 upon which the magnetic head assembly 35 is guided during lateral, generally horizontal, stepping action. The magnetic head assembly 35 includes two spaced vertical guide plates 62, the opposing edges of which have V-shaped indentures 63 into which slidably fits a U-shaped backing member 64 (shown in dashed lines in FIG. 4). Both the two vertical guide plates 62 and also the backing member 64 are preferably made of aluminum with the backing member 64 being anodized. To the bottom of backing member 64 are attached two support blocks 66 and 68 between which is sandwiched the lower end of a planar, cantilevered spring 70. The top of spring 70, which is biased slightly away from typewriter carriage 14, is secured to a bar 72 having a U-shaped indenture 73 into which snugly fits rectilinear magnetic head 36. The magnetic head 36 is held tightly in place by screw 74 journalled through inverted U-shaped bracket 76. In turn, bracket 76 is rigidly fastened to bar 72 with spring 70 sandwiched therebetween. A guide rod 78 projects from bar 72 through a hole (not visible in FIG. 4) in guide bracket 76. The bottom of guide bracket 76 is secured to the lower portion of backing member 64. One end of a flexible electrical cable 80 is secured to guide bracket 76 from which end extend conductors coupled to the terminals (not shown) of magnetic head 36. Conductors from the other end of cable 80 are connected (not shown in FIG. 4) to write driver and pre-amplifier circuits 150, 160 as schematically illustrated in FIG. 5.

Each of the two vertical guide plates 62 is rigidly secured to two feet 83 of magnetic head transport frame 82 by screws 84. Frame 82 is in turn secured to typewriter carriage 14 by mounting bracket 86. From each of four horizontal projections 88 (only two of these being visible in FIG. 4) of frame 82 extend a set of axles 90 having roller bearings 92 rotatably mounted thereon. Each set consists of two axles 90 oriented orthogonally to one another. Each of the eight roller bearings 92 rotatably mounted on the four sets of paired axles 90 contact one of the guide rails 60. With the magnetic head assembly 35 so secured to carriage 14 in contact with guide rails 60, lateral movement of the typewriter carriage 14 (and platen 16, thereof) causes lateral movement of magnetic head 36 "pantographically" (i.e., linearly corresponding motion) on a one to one lateral, linear displacement ratio over the surface of card support backing plate 30 and magnetic card 34 positioned thereon.

Vertical movement of magnetic head 36 is effected by rotation of platen 16 through a transmission drive comprising a drive chain 100 which rotatably couples drive pulley 102 with platen 16 through slot 104 in carriage 14. Drive pulley 102 is linked to gear train 106 by means of square drive shaft 108. To the last gear 107 in gear train 106 is secured pulley 110 which rotatably engages drive chain 112. Drive chain 112 is in turn fastened to U-shaped backing member 64 to which magnetic head 36 is held. A detent mechanism 111 (not detailed, but similar to the platen detents well known in the typewriter art, for instance) is mounted to one of the vertical guide plates 62 and engages gear 107 in gear train 106.

Another embodiment of the present invention is shown in FIGS. 6 and 6A. Here, a single element ball

printing head **116** having font **117** thereon is again "pantographically" linked to magnetic head **118.** The printing and magnetic head assembly **119** (which comprises means such as fasteners for affixing magnetic head **118** to the unnumbered supporting structure for printing head **116** in known fashion) is mounted for lateral stepping movement with respect to platen **120** and magnetic card backing plate **122** as shown by arrows **123** in FIG. **6A.** Magnetic card backing plate **122** is also linked to platen **120** by a rack and pinion assembly **124** whereby rotation of platen **120** imparts horizontal stepping movement of backing plate **122** with respect to magnetic head **118** as shown by arrows **125** in FIG. **6.** The latter stepping movements provide line-to-line spacing magnetic recordings.

In FIGS. 7 and 7A is shown another embodiment of the invention. Here, as opposed to the embodiment shown in FIGS. 6 and 6A, the typewriter carriage itself (i.e., plates **128**) moves laterally in operation, but magnetic head **130** and printed record station do not. Platen **128,** holding a sheet of printable paper **138** (FIG. 7 only), is positioned between typebar **126** and magnetic head **130.** Two sets of mutually engaging rollers **132** here support magnetic record **134** adjacent magnetic head **130.** Gear train **136** couples platen **128** with at least one of the rollers **132** whereby rotation of platen **128** causes magnetic record **134** to move in a vertical plane adjacent magnetic head **130.** Lateral stepping of platen **128** causes rollers **132** (and record **134**) to likewise laterally step with respect to magnetic head **130.**

In FIGS. 8 and 8A is shown yet another embodiment of the invention which is similar to that shown in FIGS. 6 and 6A. This embodiment comprises the same elements as that shown in FIGS. 6 and 6A, except that here record backing plate **122** instead of magnetic head **118** is mechanically linked to ball printing head **116.** Here, magnetic head **118** is linked to platen **120** by rack and pinion assembly **124.** Of the two embodiments shown in FIGS. 6 and 8, the former is preferred for its compactness since the magnetic card support **122** does not move laterally.

The mechanical, pantographic-like linking of one of the typewriter elements with one of the magnetic recorder elements in the various manners illustrated in the drawing eliminates the need for independent magnetic recorder drive means. This is because relative lateral motion between the typewriter platen and printing type in effecting individual character spacing in one line of print is directly transmitted to the recorder elements. Thus, in the embodiment shown in FIGS. 1–5 lateral movement of typewriter carriage **14** and platen **16** in and of itself causes magnetic head **36** to be laterally stepped over magnetic record support **30** or a magnetic record **34** supported thereon. Not only is magnetic head **36** thereby positioned over magnetic card **34,** but the motion required for magnetic recording itself is provided. Of course, should only the positioning action be desired, independent means could be provided for vibrating magnetic head **36** to achieve recording motion.

As shown in FIG. **5,** input signals from typewriter keyboard **10** or from a remote source extraneous to the machine may be fed to the digital electronics **152** wherein they are encoded as a pair of parallel signal outputs. One of these encoded signal outputs **154** is fed to write driver **150** for recording serial data bits by means of the read and write magnetic head **36** on a magnetic record **34** positioned adjacent thereto. The other parallel signal output may be decoded by a suitable decoding matrix (not shown, but known) and fed via line **156** to actuating solenoids, say, in the typewriter printer **158.** The magnetic head in known fashion **36** is also adapted to reproduce magnetically recorded signals and to feed them as electric signals via pre-amplifier **160** to digital electronics **152.** By these well-known means one may simultaneously make printed and magnetic records of the keyboard input, may edit such records by re-entering correcting keyboard signals, and may also make printed records (sheets **20**) from magnetic records (cards **34**) without input signals from keyboard **10.**

It should be understood that the just-described embodiments are merely illustrative of principles of the invention and that many modifications may be made thereto without departure from the spirit and scope of the invention as set forth in the following claims.

We claim:

1. An editing typewriter comprising typewriter elements consisting of a platen for holding and feeding a sheet and printing type spaced from the platen; means for stepping one of the typewriter elements with respect to the other of the typewriter elements to effect character spacing within a line of type on the sheet; and means, including manual means, for stepping the platen to feed the sheet held thereon in a direction orthogonal to the character spacing to effect line-to-line spacing; in combination with

magnetic recorder elements in said typewriter operable in serial-by-bit fashion and comprising a unitary read and write magnetic head together with a magnetic card and a support for said magnetic card, said magnetic card being separate from said sheet; and

mechanical means positively responsive to said stepping means for character spacing and line-to-line spacing, including manually-controlled line-to-line spacing, and cooperable respectively with one of said magnetic head and card support of said magnetic recorder elements whereby said one of said magnetic head and card support may be linearly correspondingly stepped with respect to the other of said magnetic head and card support when said platen and said printing type are stepped in said character and line-to-line spacing.

2. An editing typewriter in accordance with claim **1** comprising a typewriter carriage and a stationary printing station, and wherein said platen is cylindrical and rotatably mounted on said carriage for incremental angular stepping, said printing type are mounted for movement and into and out of positions of contact with said platen at said stationary printing station, and wherein said carriage is mounted for stepping movement in a lateral path through said printing station.

3. An editing typewriter in accordance with claim **2** wherein said magnetic head is mounted for movement with said carriage, and said magnetic card support positions said magnetic card in a plane substantially parallel to said lateral carriage path.

4. An editing typewriter in accordance with claim **3,** wherein said mechanical means comprise means for stepping said magnetic head with respect to said magnetic card support over said plane in a direction substantially orthogonal to said lateral carriage path to

provide line space stepping response to angular stepping of said platen.

5. An editing typewriter in accordance with claim **4** wherein said means for stepping said magnetic head in said direction substantially orthogoanl to said lateral carriage path includes drive transmission means mechanically linking said magnetic head with said rotatably mounted platen.

6. An editing typewriter in accordance with claim **5** wherein said drive transmission means includes a train of gears and means for detenting one of said gears.

7. An editing typewriter in accordance with claim **1** wherein said printing type is a font member steppable to effect said character spacing; and said magnetic head is linked to said font member.

8. An editing typewriter in accordance with claim **7** wherein said printing type comprises a ball printing element having a convex surface from which character font project.

9. An editing typewriter in accordance with claim **7** wherein said platen is cylindrical and is mechanically linked by rack and pinion drive transmission means with said magnetic card support to provide line space stepping of the magnetic card in response to angular stepping of said platen.

10. An editing typewriter in accordance with claim **1** and said platen is cylindrical, wherein said magnetic card support includes a roller mechanically coupled to said platen by gear train means to provide line space stepping of said magnetic card in response to angular stepping of said platen.

11. An editing typewriter in accordance with claim **1** wherein said magnetic head is mechanically linked by rack and pinion drive transmission means with said platen to provide line space stepping of said magnetic head in response to angular stepping of said platen.

* * * * *