United States Patent [19]

Rooney

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[54] **TYPEWRITES WITH SINGLE SPRING TO PROVIDE LETTERSPACING AND PRINTING**

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[52] **U.S. Cl.** **197/55,** 197/18

[51] **Int. Cl.** **B31j 1/40**

[58] **Field of Search** 197/55, 49, 18

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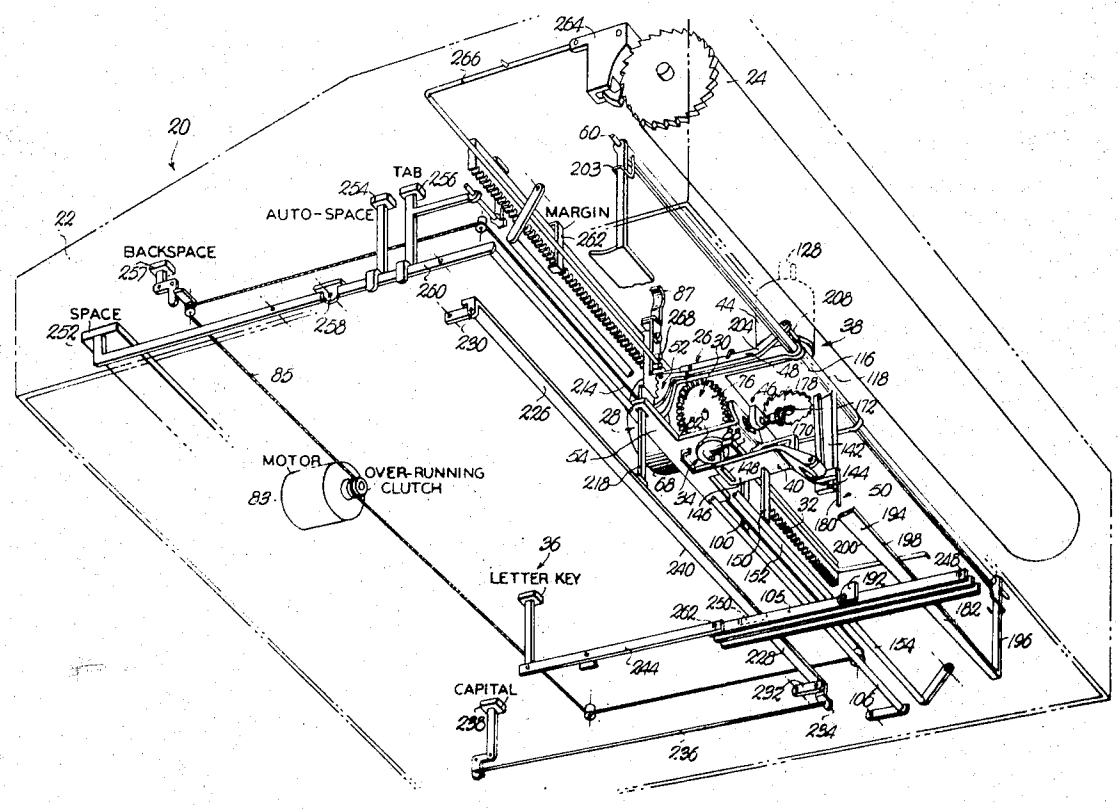
Primary Examiner—Edgar S. Burr

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[57] **ABSTRACT**

An imprinting apparatus in the general form of a typewriter has shiftable carriage and imprinting assemblies and a stationary platen for imprinting on a sheet of paper or the like by the swinging movement of a vertically extending, cylindrically-shaped imprinting head toward the platen as the imprinting and carriage assemblies shift along a path of travel juxtaposed with the platen. The apparatus employs a windable mainspring and drive gear mechanism operably coupled with a releasable spacing mechanism to incrementally shift the carriage and imprinting assemblies in an advancing direction along the path of travel, under the constant bias of the mainspring; an operating assembly for operably coupling the imprinting assembly with the drive gear mechanism, whereby the imprinting head is swung toward and away from the platen during the shifting of the imprinting and carriage assemblies a single incremental distance along the path of travel corresponding to the spacing of a single character, with swinging of the imprinting head being directly responsive to and effected by the shifting of the imprinting and carriage assemblies in the advancing direction along the path of travel; and a rotating and elevating mechanism directly responsive to and actuated by the shifting of the imprinting assembly toward the platen for positioning the imprinting head in a predetermined position wherein a selected character on the head may be imprinted on the sheet of paper.

39 Claims, 18 Drawing Figures



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SHEET 1 OF 5

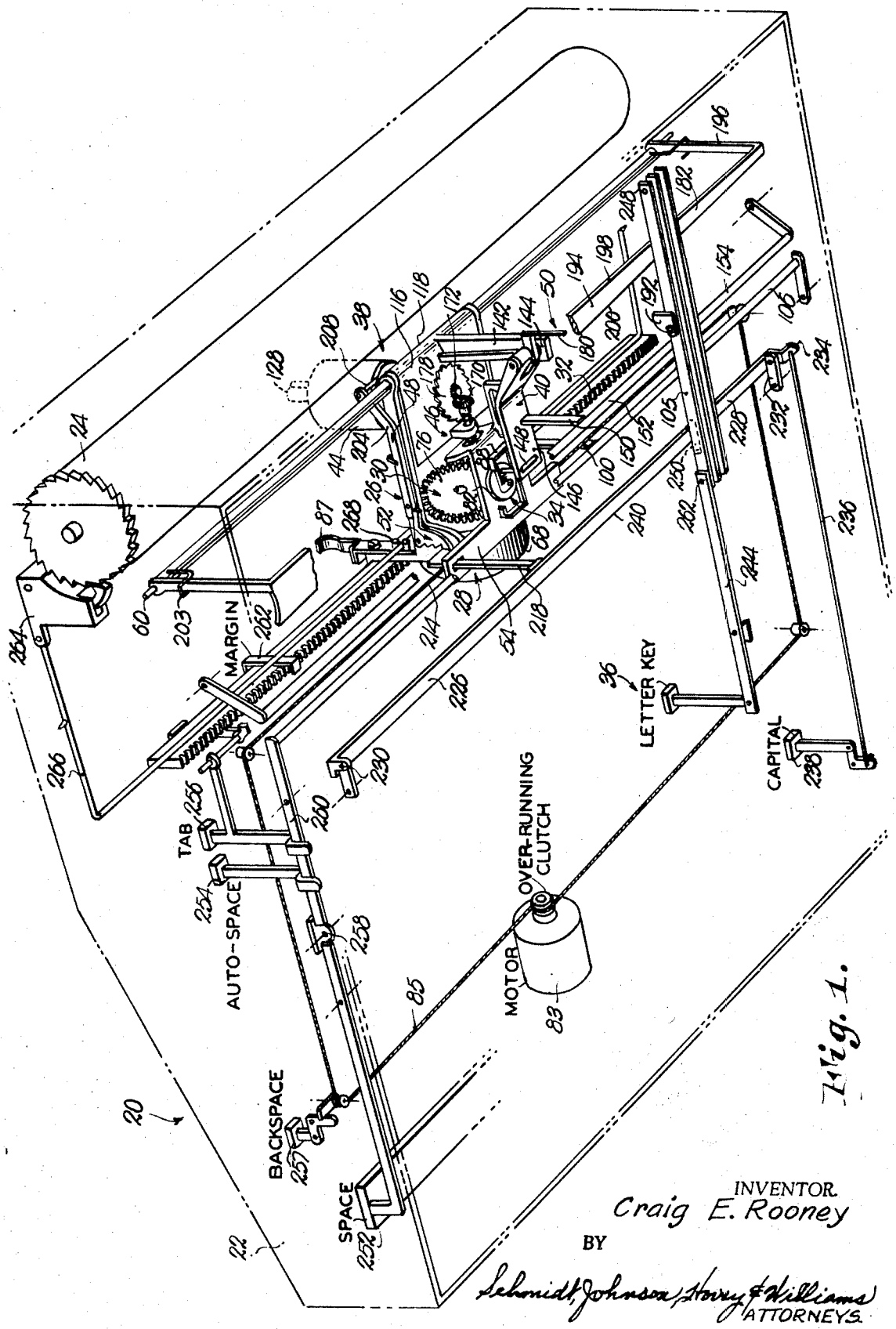


Fig. 1.

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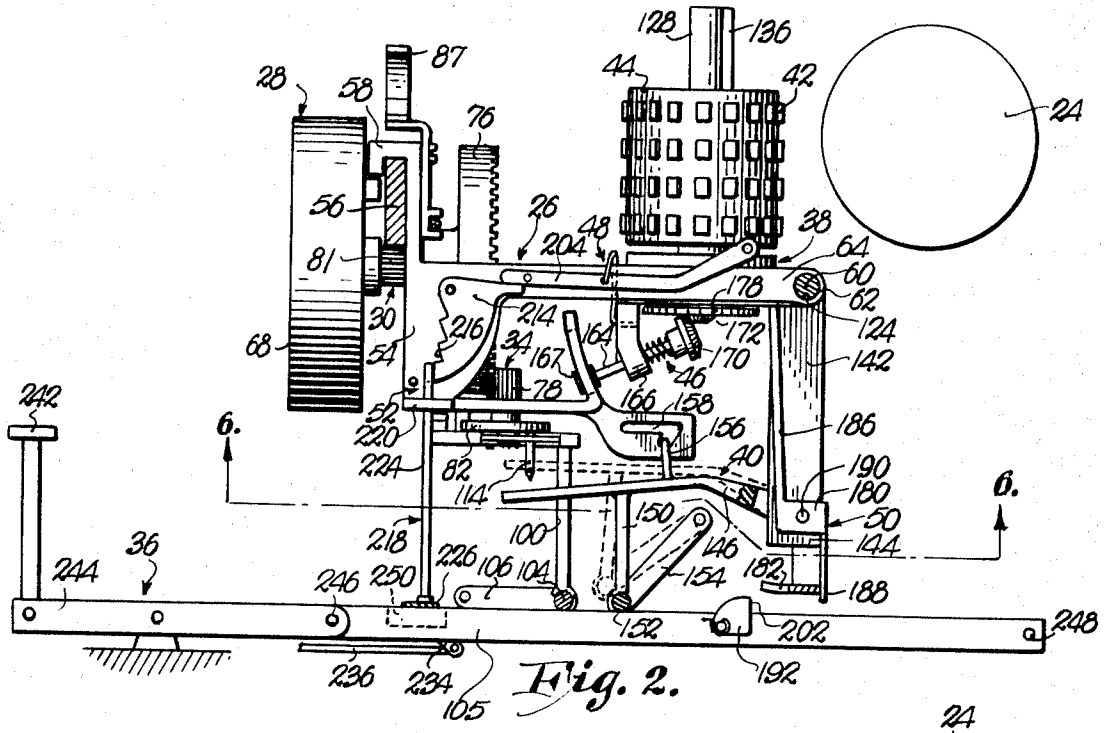


Fig. 2.

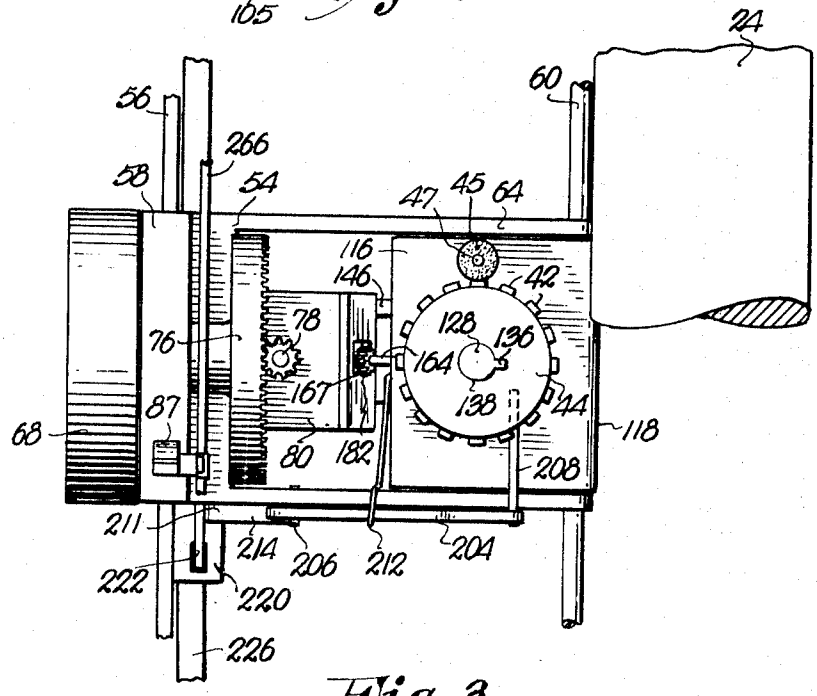


Fig. 3.

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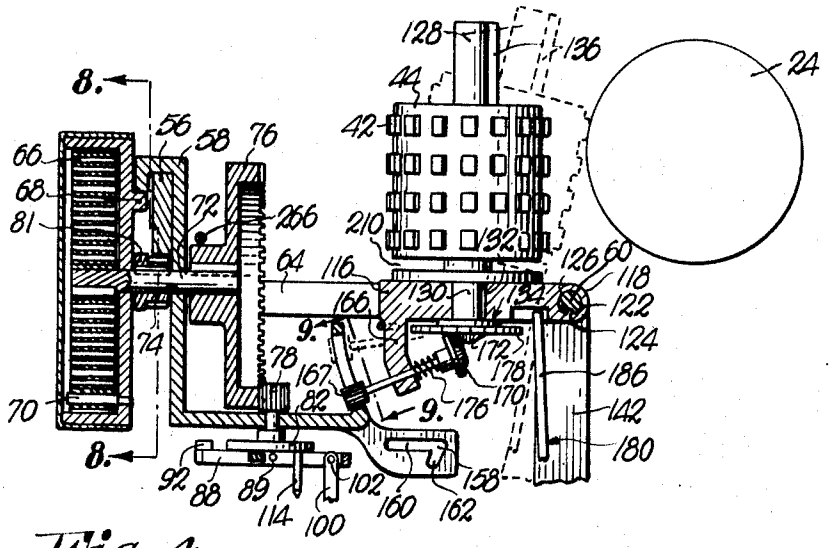


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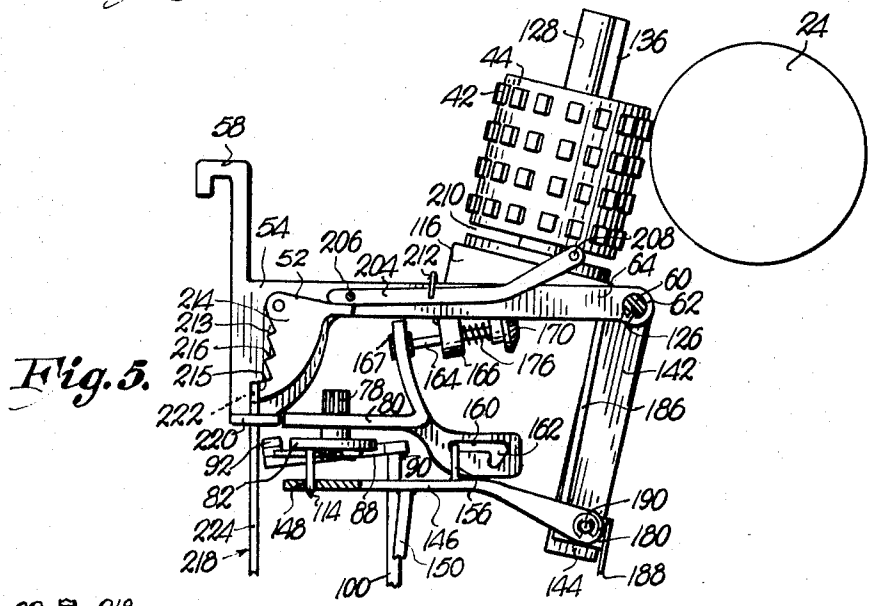


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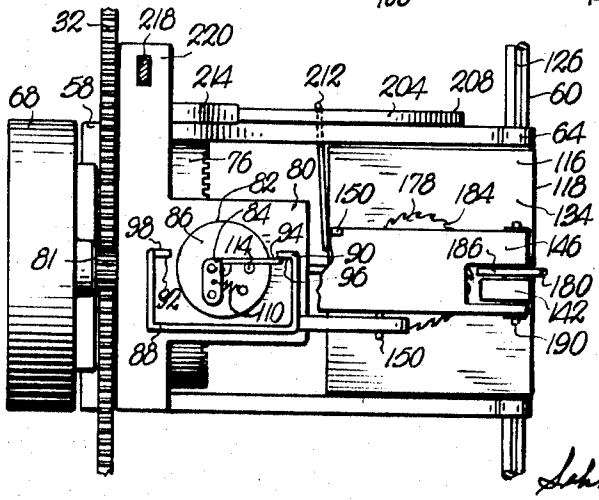


Fig. 6.

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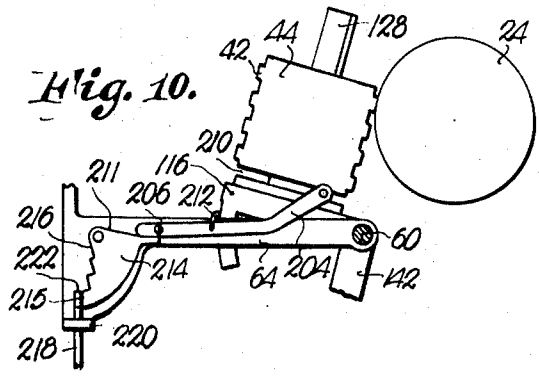


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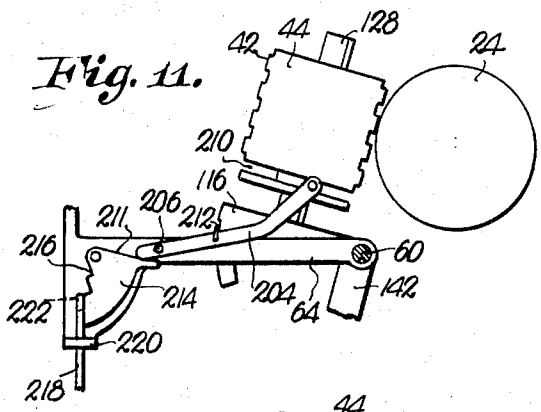


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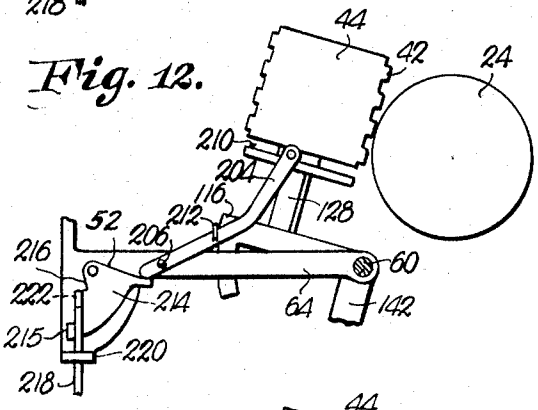


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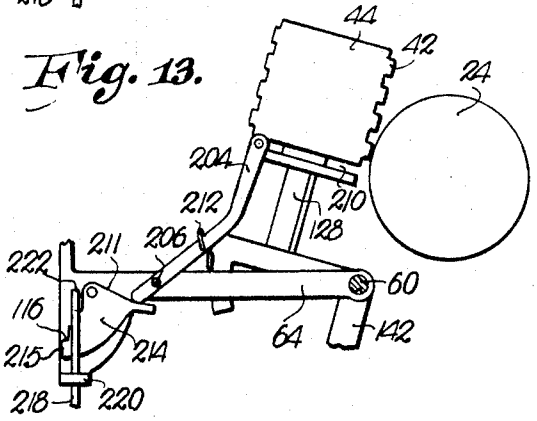


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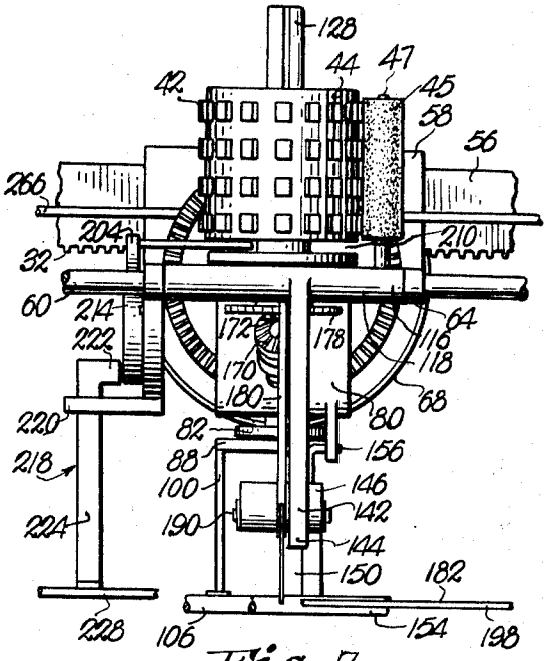


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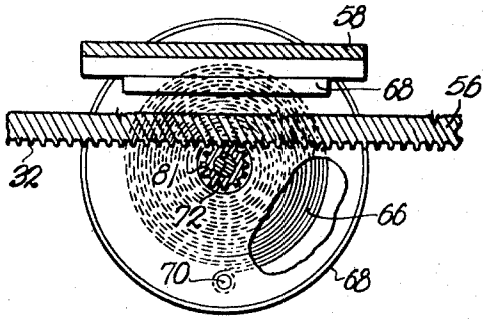


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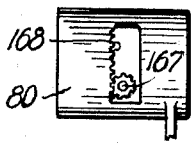


Fig. 9.

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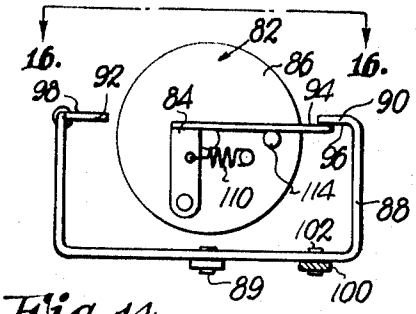


Fig. 14.

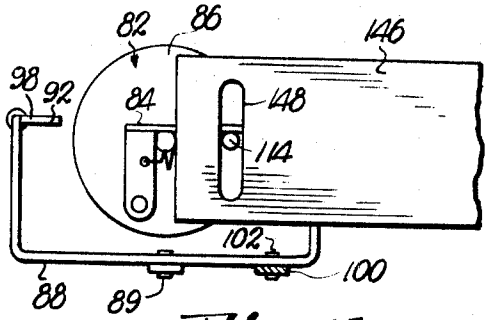


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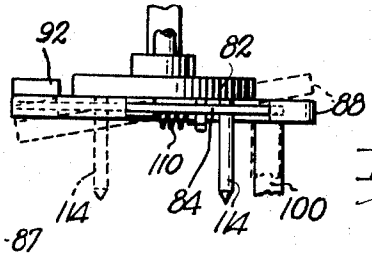


Fig. 16.

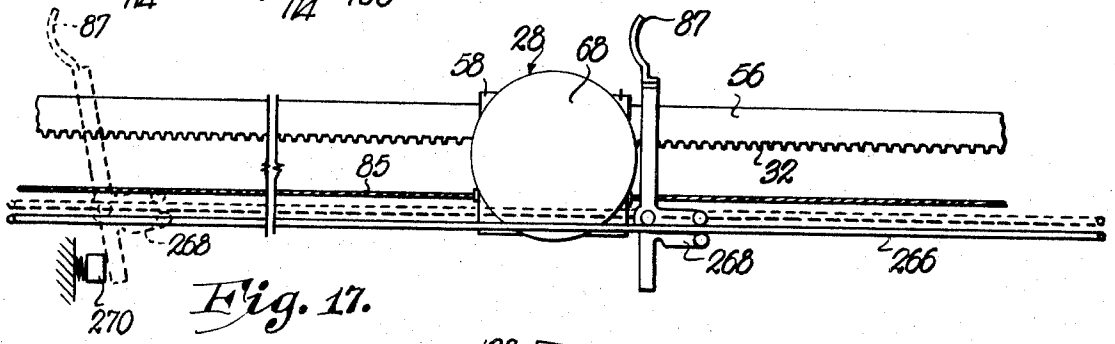


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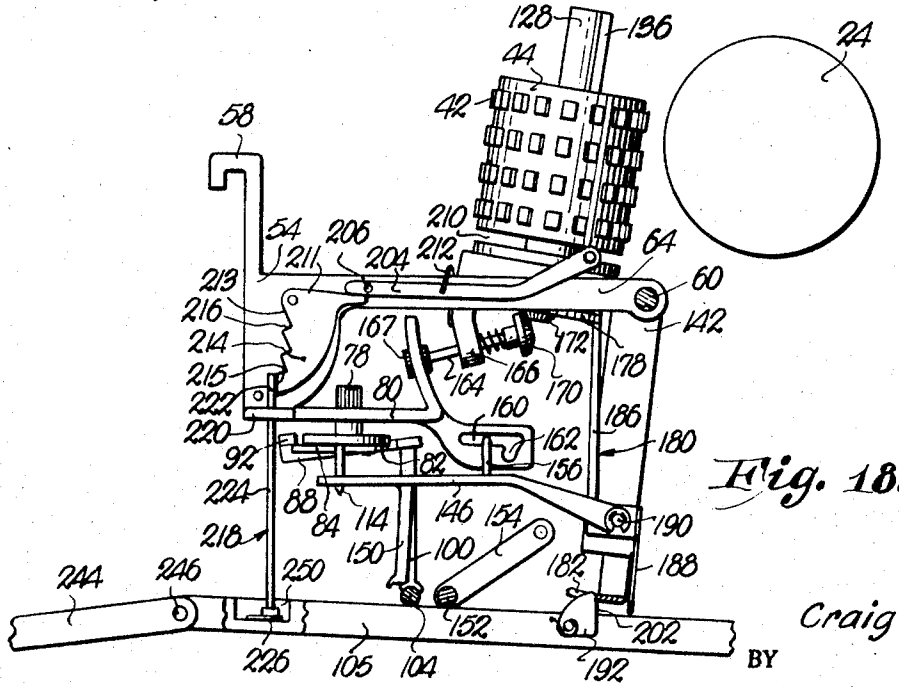


Fig. 18.

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TYPEWRITES WITH SINGLE SPRING TO PROVIDE LETTERSPACING AND PRINTING

This invention relates to the field of imprinting apparatus and, more particularly, to a typewriter having a stationary platen and a shiftable carriage and imprinting assembly actuatable by a windable mainspring.

The advantages and benefits of a typewriter which employs a shiftable, integral, multicharacter imprinting assembly used in conjunction with a stationary platen are of common knowledge in the prior art. Heretofore, however, there has been only one basic mechanical approach for a typewriter of this nature. This approach centers on the use of a spherical imprinting head, having a plurality of character imprinting elements around its outer surface, which must be rotated and tilted to dispose a selected character in an imprinting position. A rotating drive roller, driven by a constant speed electrical motor and a series of separate operating mechanisms each acting in the nature of a slip clutch and corresponding to particular character are conventionally used to provide the motive force to rotate and tilt the imprinting head to the desired position. The actual imprinting action, as well as the other actions and functions of the typewriter, are accomplished by a series of timed, but unrelated separate movements of a plurality of separate mechanisms, all deriving their power from the constant speed electric motor.

This conventional approach, although providing a workable method is not completely successful in providing a fast acting, relatively simple and economical typing apparatus. The complexity and intricacy of the various separate actions, as well as the speed limitations and cost inherent in the constant speed drive motor cause such machines to be relatively expensive and to have a limited range of application. Moreover, the repair and adjustment of such apparatus is of intricate and costly nature.

Accordingly, it is an important object of the present invention to provide a typewriter apparatus utilizing a shiftable carriage and imprinting assembly in conjunction with a stationary platen which offers all of the benefits and advantages of a typewriter of this general class without the limitations, complexities, and costs associated with prior art apparatus.

Another important object is to provide such an apparatus which employs an economical and windable mainspring to propel all of the mechanisms of the apparatus through all of the functions and movements necessary to imprint a character on a sheet of paper in a series of ordered, interconnected operational movements.

A still further important object of the present invention is to provide such an apparatus which substantially eliminates the noise and internal physical striking action of the imprinting head associated with prior art devices by employing a pressure imprinting action without sacrificing the printing speed and efficiency of the imprinting head.

Another object is to provide such a typewriter which may be economically and practicably used in a full range of applications and uses.

A further object is to provide such a typewriter apparatus which employs mechanism offering a greater degree of control, operating efficiency, and reliability than that obtained from prior art devices.

Other objects of the invention, including significant improvements in various functional parts and their interrelationships, will become apparent or be made clear from the drawings and description of an illustrative embodiment that follows.

In the drawings:

FIG. 1 is a perspective view of an imprinting device embodying the principles of the present invention looking upwardly at an angle through the bottom of the device;

FIG. 2 is an enlarged, side elevational view of the device of FIG. 1 with portions of the base being deleted to more clearly reveal details of construction;

FIG. 3 is a fragmentary top plan view of the carriage and imprinting assemblies shown in FIG. 2;

FIG. 4 is a fragmentary, side elevational view of the carriage assembly of FIG. 2 showing the swinging action of the imprinting and spin mechanisms by dotted lines;

FIG. 5 is a fragmentary, side elevational view of the carriage assembly of FIG. 2 showing the relative position of the imprinting mechanism, spacing mechanism and spin mechanism when the imprinting mechanism is in its imprinting position;

FIG. 6 is a cross-sectional view of the carriage assembly looking up from the bottom;

FIG. 7 is a fragmentary, rear elevational view of the carriage assembly and imprinting mechanism of FIG. 2;

FIG. 8 is a cross-sectional view taken along line 8—8 of FIG. 4 showing the carriage advancing mechanism with a portion of the spring housing being broken away to reveal the mainspring therein;

FIG. 9 is a cross-sectional view taken along line 9—9 of FIG. 4 showing a portion of the imprinting head rotating mechanism;

FIG. 10 is a reduced, fragmentary, side elevational view of a portion of the imprinting head elevation, and elevation selection mechanism of FIG. 2 illustrating the position of the imprinting mechanism during imprinting of the fourth character row;

FIG. 11 is similar to FIG. 10 showing the position of the components during imprinting of the third character row;

FIG. 12 is similar to FIG. 10 showing the position of the components during imprinting of the second character row;

FIG. 13 is similar to FIG. 10 showing the position of the components during imprinting of the first character row;

FIG. 14 is a further enlarged bottom plan view of the release and spacing mechanism with the spacing sensor shown in section;

FIG. 15 is similar to FIG. 14 showing the operative relationship of the spacing mechanism with the operating mechanism;

FIG. 16 is a side elevational view of the release and spacing mechanism taken along line 16—16 of FIG. 14 looking in the direction of the arrows;

FIG. 17 is an enlarged fragmentary, front elevational view of the carriage advancing mechanism showing the action of the latter in broken lines; and

FIG. 18 is a fragmentary, side elevational view of the carriage assembly of FIG. 1, illustrating the operative relationship of the components of the spin selection mechanism.

A typewriter similar in purpose to that of a conventional typewriter has been selected to illustrate the principles of the present invention. It should be understood however, that these principles may be equally ap-

plied to other types of imprinting machines such as computer print-out mechanisms, teletype machines or the like and should, therefore, not be deemed limited to use in the form of a typewriter.

A typewriter apparatus embodying the principles of the present invention is designated by the numeral **20** in FIG. **1.** Apparatus **20** includes a base **22** of generally similar configuration and construction as that for a conventional typewriter. Base **22** is provided with a horizontally extending, stationary platen **24** pivotally mounted thereon in its customary position in the uppermost rear portion of base **22.** A carriage assembly **26** is slidably mounted on base **22** for shifting movement along a horizontal path disposed in front of and juxtaposed with platen **24.** A mainspring assembly **28** and driven gear mechanism **30** are mounted on carriage **26** with the drive gear **30** engaging a horizontal rack or gear track **32** extending across base **22** in parallel relationship with platen **24** for continuously urging carriage **26** to shift in one direction along the path of travel corresponding to the advancing direction of typing on the sheet of paper (not shown). A releasable spacing mechanism **34** is provided on carriage **26** and is coupled with drive gear mechanism **30** for holding carriage **26** against movement in the advancing direction until one of a plurality of control keys **36** is actuated, at which time the spacing mechanism is released, and carriage **26** is allowed to shift a predetermined distance along the path corresponding to the spacing of a single character. An imprinting assembly **38** is slidably and swingably mounted on base **22** for imprinting on a sheet of paper or the like by swinging toward and into engagement with the sheet of paper as it is shifted in the advancing direction along the path. Imprinting assembly **38** is carried in the advancing direction by carriage **26,** which is mounted in partial circumscribing relationship with imprinting assembly **38.** An operating mechanism **40** is provided on imprinting assembly **38** which, when actuated by one of the control keys **36,** couples imprinting assembly **38** to gear mechanism **30** whereby the rotational movement of gear mechanism **30** is translated into a swinging movement of imprinting assembly toward the sheet of paper, the swinging of imprinting assembly being accomplished simultaneously and in direct relationship with the shifting of the latter in the advancing direction along the path of travel. The actual imprinting on the sheet of paper is achieved by a plurality of character imprinting elements **42** provided in spaced horizontal and vertical rows on the surface of an imprinting head **44,** the latter being rotatably and slidably mounted on imprinting assembly **38.** Imprinting head **44** is rotated about a generally vertical extending axis and is shifted longitudinally of the same axis by an elevation mechanism **48** in order to shift head **44** into a predetermined position wherein a selected character imprinting element **42** is disposed in a position for imprinting on the sheet of paper. Both spin mechanism **46** and elevation mechanism **48** hereinafter more fully described are driven by the swinging movement of the imprinting assembly **38** and are both provided with spin and elevation selection assemblies **50** and **52** respectively responsive to control keys **36** for stopping the rotation and elevation of head **44** at the predetermined position.

It should be noted at this point that the mainspring mechanism **28** and drive gear **30** propel the above mentioned components and assemblies through all the operations and functions necessary to imprint a character on a sheet of paper or the like in an ordered, simultaneous sequence of connected movements. This action and the interrelationship of the components of typewriter **20** may be more clearly seen from the detailed description of the various components which follows.

Referring to FIG. **2,** platen **24** is similar in configuration and construction to the platens of conventional typewriters, however, unlike the conventional units, platen **24** is stationary and does not reciprocably shift along its longitudinal axis. The only function of platen **24** is to support a sheet of paper or the like in a position wherein the latter may be imprinted by imprinting assembly **38** as its shifts in the advancing direction along the path of travel.

Carriage assembly **26** includes framework structure **54** slidably mounted on base **22** by means of a horizontal bar **56** mounted on base **22** and extending generally parallel to and juxtaposed with platen **24.** The upper portion of bar **56** is received within a hook-shaped structure **58** on the front portion of framework **54** remote from platen **24** for supporting the front side of framework **54.** The rear of framework **54,** adjacent platen **24,** is supported by means of a horizontal rod **60** mounted on base **22** extending parallel to and juxtaposed with platen **24.** Rod **60** is received within openings **62** provided transversely through arms **64** of framework **54** at their respective rear ends adjacent platen **24,** arms **64** comprising a pair of spaced, elongated, horizontal members extending outwardly from framework **54** generally toward platen **24.**

Mainspring mechanism **28** includes a conventional windable mainspring **66** (FIG. **4**) enclosed within a spring housing **68** and attached thereto by a pin **70** at the outer end of mainspring **66** to prevent rotation of the outer end relative to housing **68.** The other end of spring **66** is secured to a horizontal drive shaft **72** of drive mechanism **30** extending through an opening **74** provided in framework **54** and received within the hub of a ring gear **76** mounted transversely of the longitudinal axis of drive shaft **72.** Ring gear **76** is complementally engaged by a pinion **78** extending downwardly through a horizontal bottom portion **80** of framework **54.** An annular drive gear **81** of drive gear mechanism **30** is mounted on drive shaft **72** intermediate of spring **66** and ring gear **76** and complementally engages gear track **32** on the bottom edge of bar **56.** Drive gear **81,** drive shaft **72,** and gear track **32** thus permit spring **66** to shift carriage **26** in the advancing direction along the path when the spacing mechanism **34** is released. Spring **66** is wound by shifting carriage **26** in the direction opposite to that of the advancing direction. This is preferably accomplished by the action of a rewind motor **83** and rewind cable **85** attached to carriage **26** when actuated by an operator. The rewinding may also be performed by manually shifting carriage **26** by means of a conventional rewind lever **87** on top of carriage **26.** As may be appreciated, spring **66** continuously biases carriage **26** in the advancing direction along the path of travel and would continuously shift carriage **26** in the same direction at a progressing increasing acceleration rate if it were not releasably secured by the spacing mechanism **34.** It should be noted that the physical size and force of spring **66** is determined by the amount of friction between the various moving parts, the mass of the moving parts, and the

maximum typing speed that is required for any specific application.

Spacing mechanism **34** includes spacing disc **82** secured transversely on the free end of pinion **78** in a position disposed below and parallel to bottom portion **80** of framework **54.** An L-shaped catch **84** (FIG. **6**) is pivotally mounted at one end thereof to the bottom surface **86** of spacing disc **82** and extends laterally outwardly therefrom at the other end. A U-shaped stop element **88** is rockably mounted on bottom portion **80** of framework **54** at a point thereon indicated in FIG. **4** by the numeral **89** and is disposed therebeneath in partial circumscribing relationship with spacing disc **82.** Element **88** includes a pair of opposed, inturned tabs **90** and **92** extending inwardly toward spacing disc **82** and toward each other in substantial alignment therebetween with tab **92** being laterally offset in the direction toward bottom surface **80** relative to tab **90.**

The action of the spacing mechanism **34** consists of the rotation of spacing disc **82** with pinion **78** during the shifting of carriage **26** in the advancing direction along the path of travel thereof. Catch **84** rotates with spacing disc **82** and is disposed in a position wherein surface **94** of catch **84** engages either surface **96** of tab **90** or surface **98** of tab **92** as catch **84** and spacing components **82** rotate with pinion **78.** The position of element **88** determines which of the surfaces **96** or **98** will engage the surface **94** of catch **84.** Referring to FIG. **16,** it may be seen that if element **88** were disposed along the position indicated by the solid line, surface **96** of tab **90** would engage surface **94** of the catch **84** as the latter is rotated and would thereby hold spacing component **82** against further rotation in a direction corresponding to the shifting of carriage **26** in the direction of advancing along the path of travel thereof. On the other hand, if element **88** were disposed in the position indicated by the broken line of FIG. **16,** then it may be seen that surface **98** of tab **92** will engage surface **94** of catch **84** as the latter rotates and similarly hold spacing component **82** against further rotation. The reason for releasably holding spacing component **82** in such a manner will be made more clear hereinafter.

Element **88** is shifted from one position to the other as indicated in FIG. **16** by a spacing sensor **100** pivotally coupled to element **88** at a point thereon indicated in FIG. **14** by the numeral **102.** The lower end of spacing sensor **100** slidably engages the central portion **104** of a generally elongated, U-shaped spacing crossbar **106** swingably mounted at its ends on base **22.** Central portion **104** overlies and is supported by the primary linkages **105** of control keys **36** in such a manner as to be swung upwardly by the primary linkage **105** of one of the control keys **36** when the latter is actuated. The swinging of central portion **104** effects a similar upward shifting of spacer sensor **100** and a swinging of element **88** from one position to the other as indicated in FIG. **16.**

A spiral spring **110** is secured to catch **84** at a point adjacent the one end of catch **84** and is attached to the bottom surface **86** of spacing disc **82** in such a manner as to bias catch **84** into engagement with a coupling pin **114** extending downwardly from surface **86** at a position adjacent the peripheral edge of spacing disc **82.** Spring **110** allows catch **84** to swing about its pivotal axis to an extent necessary to allow catch **84** to slip by tabs **90** and **92** when spacing disc component **82** and catch **84** are rotated in a direction corresponding to the shifting of carriage **26** in the direction of winding of mainspring **66** along the path of travel (corresponding to clockwise rotation of the spacing disc **82** in FIG. **14**). Pin **114,** however, serves to prevent catch **84** from swinging about its pivotal axis during rotation of spacing disc **82** and catch **84** in a direction corresponding to the advancing of carriage **26** along the path of travel (corresponding to counterclockwise rotation of disc **82** in FIG. **14**).

Imprinting mechanism **38** includes a platform **116** slidably mounted on rod **60** adjacent its rear edge **118,** proximal to platen **24,** with platform **116** being disposed in the space between arms **64** of framework **54** when the assembly is in its rest position as illustrated in FIG. **2.** Rod **60** is rotatably mounted on base **22** and is slidably received within and through an opening **122** extending through platform **116** adjacent the rear edge **118** of the latter. A ridge **124** extends the length of opening **122** and is complementally received within a notch **126** provided longitudinally of rod **60.** As may be seen from viewing FIGS. **1, 4** and **5,** the notch **126** and ridge **124** enable platform **116** to rotate rod **60** about its longitudinal axis when platform **116** is swung by operating mechanism **40** during the shifting of carriage **26** in the advancing direction along the path of travel thereof. Notch **126** and ridge **124** also permit platform **116** to slide along the length of rod **60** while rotating with rod **60** about its longitudinal axis. The significance of this relationship will be made more clear in the description of the spin selection assembly **50.** It may also be seen that arms **64** act as pushing elements to shift platform **116** in either direction along rod **60** as carriage **26** is shifted in either direction along the path of travel.

Platform **116** is provided with a vertical post **128** extending upwardly from platform **116** with a portion **130** thereof extending through opening **132** in platform **116** below bottom surface **134** of the latter. A locking ridge **136** extends along the length of that portion of post **128** disposed above platform **116.**

Imprinting head **44** is constructed of plastic or similar lightweight material and is of generally cylindrical configuration. Head **44** is slidably mounted on post **128** with the latter being received within and through a central opening **138** (FIG. **3**) extending longitudinally of head **44.** Opening **138** is of key-shaped configuration to complementally receive locking ridge **136** extending longitudinally of post **128** for coupling head **44** with post **128** so that the latter may rotate head **44** while permitting the same to shift longitudinally of post **128.** The imprinting elements **42** are disposed around the outer surface of head **44** in spaced, horizontal and vertical rows, the horizontal rows preferably being four in number, with the upper case characters being divided within the two lower rows on the head **44** and the lower case characters being divided into the two upper rows on head **44.** Imprinting elements **42** may be cast integrally with imprinting head **44** but are preferably constructed in the nature of separate steel bands or the like which may be laminated to head **44.**

Those skilled in the art will understand that any conventional means may be employed to provide for the transfer of an inked impression of a selected imprinting element **42** onto a sheet of paper supported by the platen **24.** In many applications, such means might advantageously employ merely a conventional inked or

mylar typewriter ribbon (not shown) suitably mounted upon the base **22** in conventional manner with a stretch of the ribbon interposed and extending between the head **44** and the platen **24.** Since the choice of the particular inking structure per se to be used is deemed to be a mere matter of preference among conventional techniques by those skilled in the art, and since attempt to illustrate those techniques in detail in the drawings would tend to obscure or detract from the clarity of illustration of the other mechanical parts primarily involved in the invention, the showing in the drawings has been limited to the illustration in FIGS. **3** and **7** of an inking roller **45** rotatably mounted by a shaft **47** upon the platform **116** with the roller **45** disposed to contact the imprinting elements **42** to moisten the same with ink as the head **44** is rotated. Those skilled in the art will further understand that, if the inking roller technique is to be employed, conventional means for maintaining the surface of the roller **45** moist with ink will be provided, and also that a plurality of such rollers **45** may preferably be provided upon the platform **116** spaced around the periphery of the head **44** so that moistening of any imprinting element **42** that may be selected immediately prior to its impression producing operation will be assured with a minimum rotation of the head **44.**

Operating mechanism **40** includes an elongated crank component **142** securely attached to platform **116** adjacent rear edge **118** and extending downwardly therefrom in such a manner as to swing platform **116** and rotate rod **60** about its longitudinal axis when the free end **144** of crank component **142** is shifted in a generally horizontal direction toward the front of apparatus **20.** A linking component **146** is pivotally mounted to the free end **144** of crank component **142** and extends toward the front of apparatus **20** in a generally horizontal plane below spacing disc **82** of spacing mechanism **34.** Linking component **146** is provided with a transversely extending slot **148** adjacent its front end which is in direct vertical alignment with pin **114** extending downwardly from spacing disc **82.** Pin **114** is received within slot **148** when linking component **146** is swung upwardly about its pivotal point of connection with crank component **142** to an engaging position as indicated by the broken lines in FIG. **2.** When linking component **146** is raised to its engaged position with pin **114** received within slot **148,** the rotation of spacing disc **82** will cause a reciprocable movement of linking component **146** along its horizontal axis, first in a forward direction toward spring **66** and then in a rearward direction to its starting position. This same reciprocable movement of linking component **146** causes free end **144** of crank component **142** to be shifted in a similar manner thereby effecting the swinging of platform **116** toward platen **24.**

A vertically extending operating sensor **150** is securely attached at its upper end to linking component **146** and slidably engages at its lower end a central portion **152** of a generally elongated, U-shaped operating crossbar **154** (FIG. **2**) pivotally mounted at its ends on base **22.** Central portion **152** overlies and is supported by the primary linkages **105** of control keys **36** in such a manner as to be swung upwards by the primary linkage **105** of one of the control keys **36** when the latter is actuated. The upward swinging of central portion **152** effects an upward shifting movement of operating sensor **150** and a swinging movement of linking component **146** to its engaged position, as indicated by the broken line in FIG. **2.**

Linking component **146** is held in its engaged position during rotation of spacing disc **82** by a hook-shaped pin **156** extending upwardly from linking component **146** to a position wherein it is slidably received within and supported by a generally L-shaped slot **158** having a horizontal portion **160** and a slanting portion **162.** Referring to FIG. **2,** it may be seen that pin **156** is received within slanting portion **162** of slot **158** when linking component **146** is in its lower or unengaged position, is shifted upwardly along portion **162** of slot **158** as linking component **146** is shifted upwardly by operating sensor **150,** and is then supported by and received within the horizontal portion **160** as linking component **146** is shifted in the forward direction toward spring mechanism **28** during rotation of spacing disc **82.**

Spin mechanism **46** includes a drive shaft **164** rotatably mounted on the bottom surface **134** of platform **116** by means of an elongated mounting structure **166** projecting downwardly from bottom surface **134** and having an opening (not shown) which receives drive shaft **164** therethrough. The forward end of drive shaft **164** is provided with an annular gear **167,** which engages a vertically extending arcuate gear track **168** provided on framework **54** as seen in FIG. **9.** A first bevel gear **170** is mounted on the rear end of drive shaft **164** and engages a second bevel gear **172** transversely mounted on the lower end portion **130** of post **128** extending below bottom surface **134.**

Referring now to FIGS. **2** and **4,** it may be seen that when platform **116** is swung about the axis of rod **60,** drive shaft **164** is swung upwardly with platform **116,** thereby causing gear **167** to travel upwardly along the stationary gear track **168.** The traveling of gear **167** along track **168** rotates drive shaft **164** and bevel gear **170** which, in turn, rotate bevel gear **172,** thereby rotating post **128** and imprinting head **44.** Bevel gear **170** is preferably coupled to drive shaft **164** in a yieldable manner by spring **176** to permit platform **116** to continue to swing toward platen **24** when imprinting head **44** is held against rotation by spin selection mechanism **50.** It should be understood, however, that spring **176** is only one of several methods which may be used to prevent binding of platform **116.** Spin mechanism **46** should, therefore, not be deemed limited by spring **176.**

Spin selection mechanism **50** includes a sector wheel **178** mounted transversely in the portion **130** of post **128.** Sector wheel **178** is provided with a plurality of radially outwardly flaring teeth **184,** best shown in FIG. **6,** which are engaged by a spin sensor **180** at a predetermined degree of rotation of imprinting head **44** and sector wheel **178.** Spin sensor **180** prevents further rotation of head **44** once sensor **180** engages the teeth **184** of sector wheel **178** and remains in contact with teeth **184,** due to the configuration of teeth **184,** until imprinting head **44** is rotated in an opposite direction corresponding to the swinging of platform **116** away from platen **24** toward its original horizontal position. It should be noted that one tooth **184** is provided for each vertical row of imprinting elements **42** on the outer surface of imprinting head **44** and that a selected vertical row of imprinting elements **42** may be disposed in an imprinting position facing toward platen **24** when sensor **180** is swung into engagement with the particular gear tooth **184** corresponding to the selected row of imprinting elements **42.**

Sensor 180 is preferably formed of spring rod material and is elongated and of generally Z-shaped configuration having an upwardly extending leg 186 and a downwardly extending leg 188. Sensor 180 is pivotally mounted at point 190, as indicated in FIG. 2, on crank component 142 in such a manner as to permit the end of leg 186 to be swung about pivot 190 into engagement with teeth 184 of sector wheel 178. Leg 188 yieldably engages the rear edge of a generally U-shaped spin control bracket 182 and is shifted in a direction toward platen 24 by bracket 182 when the latter engages a stop piece 192 on one of the primary linkages 105 of control keys 36 when the latter has been actuated by an operator. Bracket 182, as best illustrated in FIG. 1, includes a horizontally extending, tapered central section 194 and a pair of connecting brackets 196, one on each end of central section 194 and coupled at their upward ends to rod 60 in such a manner as to cause bracket 182 to swing about rod 60 as the latter is rotated by platform 116.

Section 194 is provided with a rearwardly facing surface 198 engaged by leg 188 of sensor 180 and is further provided with a forwardly facing surface 200 which is adapted to engage the rearwardly facing vertical surface 202 of stop piece 192 when the latter has been shifted upwardly by the actuation of one of the control keys 36 (as indicated in FIG. 18). When central section 194 engages stop piece 192 the latter holds bracket 182 from further swinging movement about rod 60, however, crank component 142 and the pivotal point of connection 190 between the same and sensor 180 continue to swing the axis of rod 60, thereby causing leg 186 to swing into sector wheel 178 as crank component 142 and pivotal coupling 190 swing about the axis of rod 60. The tapering of central section 194 is provided in order to allow brackets 182 to swing through varying degrees of rotation about the axis of rod 60 before engaging stop piece 192 and being held thereby. In this regard, it may be seen that bracket 182 would be permitted to swing through a greater distance before being engaged by stop piece 192 if the latter happens to be on the primary linkage 105 of a control key 36 disposed adjacent the narrow end of central section 194. A greater degree of swinging movement of bracket 182 will permit post 128 and sector wheel 178 to rotate a greater degree than that obtainable from a lesser degree of swinging movement of bracket 182. Bracket 182 is preferably coupled to rod 60 in a yieldable manner by spring 203 to permit rod 60 to continue to rotate after bracket 182 engages stop piece 192 and is held thereby. Once again it should be noted that spring 203 is only one of many method which may be employed to prevent binding or rod 60. As may be appreciated, sensor 180 will engage a predetermined gear tooth 184 of sector wheel 178 corresponding to the actual control key 36, and thereby dispose a selected vertical row of imprinting elements 42 in a position wherein one of the elements of the row may eNgage the item to be imprinted. It should be noted that the positioning of the desired imprinting element 42 and the degree of rotation of head 44 depend upon the tapering of central portion 194 and not upon any variance in location of stop piece 192 on primary linkage 105 of the actuated operating key 36, stop piece 192 being mounted in the same position on all of the control keys 36 required with a stop piece 192.

Elevation mechanism 48 includes an elongated link 204 pivotally mounted on framework 54 at point 206 and extending toward platen 24. Link 204 is provided with a perpendicularly mounted pin 208 extending inwardly of platform 116 and slidably received within a circumferential slot 210 around the lower portion of imprinting head 44. A yieldable lifting clip 212 is pivotally coupled to link 204 at a point intermediate the pivotal point of coupling 206 and pin 208 and extends inwardly of platform 116 to a position wherein it is received within an opening (not shown) in the front edge of platform 116. Clip 212 effects an upward swinging movement of link 204 about its pivotal axis 206 and a corresponding upwardly shifting of imprinting head 44 relative to post 128 when platform 116 is swung upwardly toward platen 24. Clip 212, due to yieldable nature, also permits platform 116 to continue to swing uninterrupted after head 44 is held against further elevation by elevation selection assembly 52.

The elevation selection assembly 52 includes a stop plate 214 pivotally mounted on framework 54 and having a horizontal upper surface 211 which underlies and engages the front end of link 204 in such a manner as to permit plate 214 to be swung in a clockwise manner, as viewed in FIG. 2, by link 204 when the latter is swung upwardly to raise imprinting head 44. The front edge 213 of plate 214 is provided with a generally vertical lower surface 215 and a series of notches 216 spaced vertically along the length of the front edge 213 above surface 215 which are selectively engaged by an elevation sensor 218 for stopping the swinging of plate 214 at various degrees of rotation depending on which notch 216 sensor 218 engages. Elevation sensor 218 of inverted L-shaped configuration is slidably received through a tab 220 on framework 54 and has a horizontal leg portion 222 extending across the front edge 213 of stop plate 214 in a position wherein leg 222 engages surface 215 when sensor 218 is in its lowest or normal position or any of three notches 216 when sensor 218 is shifted upwardly. Sensor 218 also has a vertical portion 224 extending downwardly to a position where it slidably engages the central portion 226 of an elongated, generally U-shaped elevation crossbar 228, pivotally mounted at its ends on base 22. The central portion 226 is supported by the primary linkage 105 of control keys 36 for an upward swinging movement when actuated by one of the control keys 36. The upward swinging of central portion 226 thereby effects upward shifting movement of elevation sensor 218 to a position wherein leg portion 222 is shifted to engage a successively higher notch 216.

Central portion 226 of elevation crossbar 228 is pivotally mounted at its ends at a point indicate by the numeral 230 in FIG. 1 on a pair of side brackets 232 and is provided with a crank 234 pivotally coupled at its free end by a link 236 to an upper case control key 238. As may be seen in FIG. 1, if the upper case control key 238 Was actuated, central portion 226 would be rotated about pivot 230 to a position wherein the front edge 240 of central portion 226 is disposed in a horizontal position facing upwardly at apparatus 20. THe rotation of front edge 240 to its horizontal position effects an upward shifting of elevation sensor 218 to a position wherein it engages stop piece 214 at a point two notches higher than it would normally engage if central portion 226 were not rotated by the upper case control key 238.

Control keys **36** includes a plurality of letter keys **242** each having a secondary linkage system **244** pivotally coupled at point **246** in FIGS. **1** and **2** with the front end of the primary linkage **105** for translating the depression of key **242** into an upward swinging motion of linkage **105** about its pivotal point of connection **248** with base **22.** All of the primary linkages **105** are provided with stop pieces **192** as previously described. One-half of the primary linkages **105** are provided with a recess **250** under elevating crossbar **228** for reasons to be explained hereinafter.

Control keys **236** also include a spacing key **252,** a capitol or uppercase key **238** previously described, auto space key **254,** tab key **256,** and back space or carriage return key **257** for actuating rewind motor **83.** Spacing key **252** is pivotally coupled at **258** in FIG. **1** with a spacing linkage **260** which engages the lower surface of central portion **104** of spacing crossbar **106** for swinging the latter upwardly and then downwardly when spacing key **252** is actuated, thereby releasing carriage **26** for movement in the advancing direction a distance equal to one revolution of spacing disc **82** a distance corresponding to single character space.

Auto space key **254** and tab key **256** are coupled to spacing linkage **260** in such a manner as to cause spacing crossbar **106,** when either key **254** or **256** is depressed, to swing stop element **88** to a position further than that indicated by the broken line in FIG. **16,** wherein catch **84** does not engage either tab **90** or **92.** The carriage is then permitted to shift automatically along its path of travel until it either engages the margin catch **262,** shifted into position on gear track **32** by the depression of tab key **256,** or until auto spacing key **254** is released.

Finally, a conventional platen advancing mechanism **264** is provided on base **22** adjacent platen **24** and is actuated by a platen advancing rod **266** operably coupled with mechanism **264** and a roller mechanism **268** on the rewind lever **87** pivotally mounted on carriage **26.** Mechanism **264** is actuated by the lifting of advancing rod **266,** the lifting being accomplished by swinging lever **87** and roller mechanism **268** upwardly either by manually swinging lever **87** during the manual rewinding of spring **66** or by the action of a button **270** when spring **66** is automatically rewound, the latter action being shown by broken lines in FIG. **17.** It should be noted that a second embodiment of roller mechanism **268** is shown in FIG. **1.**

All of the above mentioned moving parts of apparatus **20,** except where indicated, are preferably constructed of a lightweight durable metal material, the exact specification of which will vary according to the requirements of a particular application. All other parts may be constructed of materials conventionally used in connection with this type of device.

OPERATION

In operation, a sheet of paper (not shown) is inserted under platen **24** in the usual manner for a conventional typewriter. The spring **66** is then wound by returning carriage **26** to its normal starting position corresponding to the left-hand margin of the sheet of paper. The imprinting of a selected character is set in motion by depressing a letter key **242** corresponding to the desired character to be imprinted. The depression of a letter key **242** effects an upward shifting movement of the primary linkage **105** of letter key **242** which in turn causes spacing sensor **100** to be lifted and element **88** to be swung to the position indicated by broken lines in FIG. **16,** thereby releasing spacing disc **82** for rotation. With spacing disc **82** released, ring gear **76** and drive gear **30** are free to rotate and carriage **26** is free to travel along gear track **32** under the constant bias of spring **66.** Carriage **26** is shifted in the advancing direction along the path of travel juxtaposed with platen **24** a distance equal to one-half of a character space, the carriage **26** being stopped at this point by the engagement of catch **84** on tab **92** of element **88.** If letter control key **242** is then released, spacing sensor **100** is allowed to shift downwardly to its normal position, and element **88** is swung to its normal position wherein tab **92** is shifted upwardly and out of engagement with catch **84,** catch **84** is thereby permitted to rotate to its normal position of engagement with tab **90.** If letter key **242** is pressed and released before catch **84** engages tab **92,** the catch **84** will continue to rotate uninterrupted by tap **92** to its original point of engagement with tab **90.** This feature, due to the acceleration properties of spring **66,** enables apparatus **20** to type at progressively increasing speed according to the speed of actuation and release of the various control keys **37.**

The actuation of letter key **242** and the resultant upward shifting of linkage **105** also shifts operating sensor **150** upwardly to a position wherein pin **114** of spacing component **82** is received within slot **148** in linking component **146.** At the same time that pin **114** is received within slot **148,** spacing disc **82** is released for rotation. Linking component **146** is thereby pulled by pin **114** toward the front of apparatus **20** and imprinting head **44** is swung toward and into engagement with the sheet of paper (not shown) supported by platen **24.**

The swinging of platform **116** and the resultant iteractions of gear **167** with arcuate gear track **168** and bevel gear **170** with bevel gear **172** on post **128** rotates imprinting head **44** to a predetermined position wherein the vertical row of imprinting elements **42** containing the element corresponding to the actuated letter key **242** is disposed in an imprinting position facing toward platen **24.** The rotation of head **44** is stopped at this predetermined position by the engagement of central portion **194** of the U-shaped bracket **182** with stop piece **192** on linkage **105** of the selected letter key **242.** Stop piece **192** of the actuated letter key **242** engages bracket **182** at a point along its length which permits the later to swing through a specific degree of rotation about rod **60** corresponding to the amount of rotation of the imprinting head **44** necessary to position the selected imprinting element **42** toward platen **24.** It should be noted that the maximum degree of rotation of head **44** is at least one full revolution during the swinging of platform **116** toward and into engagement with platen **24.** The actual amount of rotation, however, depends on the character selected to be imprinted. Also, if inking of the imprinting elements **42** is effected through the use of one or more inking rollers **45,** the arrangement and gearing employed to rotate the head **44** must provide for a sufficient amount of initial rotation to assure inking of any imprinting element **42** that may be selected prior to its impression producing operation and in the light of the number and positioning of the rollers **45** that are being employed.

The swinging of platform **116** also effects the upward shifting of imprinting head **44** on post **128** by the lifting action of yieldable clip **212** and link **204.** Imprinting

head 44 is stopped at a predetermined point in its shifting along post 128 by the interaction of the stop plate 214 with the elevation sensor 218 in order to position the horizontal row of imprinting elements 42 containing the element 42 corresponding to the actuated letter key 242 in the proper vertical displacement relative to platen 24 for imprinting on the sheet of paper (not shown). It may thus be appreciated that the positioning of a single imprinting element 42 in the proper position for imprinting is a product of the rotation and elevation of head 44.

If elevation sensor 218 remains in its lowermost position wherein it is engaged by the surface 215 of stop plate 214 as indicated in FIG. 10, the uppermost horizontal row of imprinting elements 42 will be disposed in the proper relationship with platen 24. If elevation sensor 218 is shifted upwardly to a position where it engages the lowermost notch 216 in stop piece 214, link 204 will be allowed to shift imprinting head upwardly to a position wherein the third horizontal row of imprinting elements will be disposed in the proper position as indicated in FIG. 11. The determination of whether elevation sensor 218 is shifted from its lowermost position to a position engageable with the second notch 216 is made by the particular letter key 242 which is actuated. If the actuated letter key is not provided with a recess 250, the upward swinging of linkage 105 will cause elevation sensor 218 to be shifted upwardly to engage the lowermost notch 216. On the other hand, if the actuated letter key 242 is provided with a recess 250, the upward swinging of linkage 105 will not effect a similar upward shifting of elevation sensor 218 and will, therefore, not permit link 204 to raise imprinting head 44 to its third row imprinting position. If the upper case control key 238 is actuated, and the central portion 226 of the elevation crossbar 228 is swung, elevation sensor 218 will then be shifted upwardly independently of any swinging of linkage 105 to a normal position engaging the second vertical notch 216 In stop piece 214, wherein the imprinting head 44 will be shifted to a position for imprinting of the second horizontal row of character imprinting elements. Should a letter key 242, not provided with a recess 250, be actuated along with upper case control key 238, elevation sensor 218 would than be shifted upwardly to a position wherein it would engage the third or uppermost notch 216 in stop piece 214 and thereby permit link 204 to shift imprinting head 44 to its uppermost position corresponding to the imprinting of the first or lowermost horizontal row of imprinting elements 42.

After head 44 has been swung into engagement with a sheet of paper (not shown) or the like, if the actuated letter key 242 has been released, platform 116 will be swung back to its original horizontal rest position within arms 64 of framework 54, and carriage 26 will continue to shift and will travel through a distance equal to one half of character space. If the actuated letter key 242 remains depressed, imprinting head 44 will remain at its paper engaging position as illustrated in FIG. 4 by broken line and in FIG. 5 until the actuate letter key 242 is released, at which time platform 116 will swing back to its original position and carriage 26 will shift the next one half space.

Referring to FIGS. 14 and 15, it should be understood that when catch 84 is in the position indicated, with surface 94 engaging tab 90, platform 116 is in its horizontal rest position. When catch 84 is rotated through one half of a rotation with catch 84 engaging tab 92, imprinting head 44 is in engagement with the sheet of paper. Referring to FIG. 15, it should be apparent to those skilled in the art that imprinting head 44 is decelerating when it closely approaches the platen due to the limited horizontal shifting of linking component 146 as pin 114 on spacing disc 82 approaches tab 92, a position corresponding to the engaging of head 44 with the sheet of paper. This feature enables apparatus 20 to type at a greatly reduced noise level without sacrificing imprinting efficiency due to the substantial mechanical advantage inherent in the interaction of spacing disc 82 with linking component 146 as pin 144 approaches tab 92.

Another important feature of apparatus 20 which should also be noted is that apparatus 20 is continuously under bias from spring 66. Apparatus 20 is, therefore, immediately ready for actuation with little or no loss in accuracy or control due to internal clearance or play, a factor beneficial in the overall typing efficiency and consistency of apparatus 20.

It will, therefore, be appreciated that the invention is adapted to achieve all of its objects in a positive and straightforward manner with reliable structure that is both economical to manufacture and practical to use in a full range of applications, and which requires little or no maintenance. Those skilled in the art will appreciate that various minor modifications and changes could be made in the details of construction of the preferred embodiment of the invention disclosed for illustrative purposes without departing from the true intent and spirit of the invention. Accordingly, the invention should be deemed as limited only by the fair scope of the claims that follow and mechanical equivalents thereof.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In an imprinting device:

base means;

support means on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel juxtaposed with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shiFting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said driVe means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said

advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said releasable means being shiftably mounted on said carriage means and including spacing means rotatably mounted on said carriage means and operably coupled with the drive means for rotational movement simultaneous with the shifting of said carriage means along said path and stop means shiftably mounted on said carriage means and operably coupled with said control means for moveMent toward and away from a position wherein said stop means engages said spacing means for holding the latter against rotation thereby releasably holding said carriage means against shifting movement along said path;

said spacing means being provided with catch means engageable with said stop means for holding the corresponding means against rotation in one direction corresponding to the shifting of said carriage in said one direction alonG said path,

said catch means being shiftable to permit free rotation of the spacing means in the opposite direction corresponding to the shifting of said carriage means in the opposite direction along said path,

said spacing means being provided with coupling means thereon for operably coupling said spacinG means with said operating means for shifting the latteR in response to rotation of said spacing means in said one direction whereby said imprinting means is shifted toward said support means,

said spacing means including a disc having a central axis of rotation,

said coupling means including a laterally projecting pin offset from the axis of rotation of said spacing means and slidably receivable within an elongated slot provided in said operating means for reciprocating the latter back and forth from said spacing means as the spacing means is rotated.

2. In an imprinting device:

base means;

support means on the base means for holding an item to be Imprinted;

shiftable means mounted on said base meanS includinG carriage means shiftable relative to said base means along a path of travel juxtaposed with said suPport means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means; advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means tO move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said releasable means being shiftably mounted on said carriage means and including spacing means rotatably mounted on said carriage means and operably coupled with the drive means for rotational movement simultaneously with the said shifting of said carriage means along said path and stop means rockably mounted on said carriage means and operably coupled with said control means for movement toward and away form a position wherein said stop mean engages said spacing means for holding the latter against rotation, thereby releasably holding said carriage means against shifting movement along said path,

said stop means being provided with a pair of opposed stop members disposed on opposite sides of said spacing means for alternately engaging and holding the latter as said stop means is swung from a first position to a second position.

3. The invention of claim **2,** wherein said stop means is provided with an elongated spacing sensor pivotally connected at one end thereof to said stop means and operably coupled at the other end thereof to said control means for shifting movement of said spacing sensor relative to the base means when actuated by said control means whereby said stop means is swung between said first and second positions.

4. The invention of claim **3,** wherein said control means includes shiftable linkage means pivotally mounted on said base means for swinging movement relative to the base means when actuated, and spacing bar means swingably mounted on said base means and extending along the length of said path of travel in juxtaposition therewith, one side of said bar means being in engagement with and carried by said shiftable linkage means for swinging movement of the bar means when said shiftable linkage means is swung, the opposite side of said bar means being slidably engaged by said spacing sensor for shifting said sensor and swinging said stop means at any position of said carriage means along the path of travel when said shiftable linkage means is shifted.

5. The invention of claim **2,** wherein said stop means includes a generally U-shaped element disposed in partial circumscribing relationship with said spacing means and having a pair of opposed, inturned tabs extending inwardly toward said spacing means and toward each other in substantial alignment therebetween with one of said tabs being laterally offset relative to said other tab.

6. The invention of claim **5,** wherein said spacing means includes a disc provided with catch means engageable with the tabs on said element for holding the spacing means against rotation in one direction corresponding to the shifting of the carriage means in said one direction along the path, said catch means being shiftable to permit free rotation of the spacing means in the opposite direction corresponding to the shifting

of said carriage means in the opposite direction along said path.

7. In an imprinting device:

base means;

support means on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel juxtaposed with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means.

said drive means being shiftably mounted on said carriage means for movement relative to the latter during shifting of said carriage means along said path,

said releasable means including a spacing means rotatably mounted on said carriage means,

said drive means including gear means rotatably mounted on said carriage means and operably coupled with said base means and said spacing means for rotating the latter during the shifting of said carriage means along said path,

said gear means including an elongated drive shaft rotatably mounted on the carriage means,

said shaft being provided with a laterally extending annular drive gear adjacent one end thereof operably engaging a rack on said base means extending parallel to and along the length of said path of travel for rotating said shaft as the carriage means shifts along said path and a ring gear on the other end thereof mounted transversely of the longitudinal axis of the shaft and operably engaging a pinion gear secured to said spacing means for translating the rotation of said shaft into rotation of said spacing means.

8. In an imprinting device:

base means;

support means on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel juxtaposed with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said drive means being shiftably mounted on said carriage means for movement relative to the latter during shifting of said carriage means along said path,

said releasable means being coupled with said drive means for shifting movement of the releasable means relative to the carriage means simultaneously with the said shifting of said carriage means,

said operating means being carried by the carriage means and engageable with said releasable means for translating the shifting of the latter into a shifting movement of said imprinting means toward and away from said support means,

said imprinting means being swingably mounted on said base means for swinging movement about a horizontal axis toward said support means,

said operating means including an elongated, swingable crank component securely attached to said imprinting means and extending laterally therefrom and an elongated, shiftable linking component, pivotally coupled adjacent one end thereof with said crank opponent and operably engageable adjacent the other end thereof with said releasable means for reciprocable movement of said linking component along its longitudinal axis whereby said crank component is swung about the pivotal axis of said imprinting means and said imprinting means is swung toward and away from said support means as said carriage means is shifted in the one direction along said path.

9. The invention of claim 8, wherein said advancing means includes a coil spring carried by said carriage means and operably coupled to said drive means for shifting the latter and said releasable means during shifting of the carriage in said one direction along said path, thereby reciprocating said linking component

along its longitudinal axis and shifting said imprinting means toward and away from the support means.

10. The invention of claim **8,** wherein said linking component is provided with an operating sensor rigidly secured thereto and operably coupled with said control means for swinging said linking component about the pivotal coupling between said linking and crank components toward said releasable means from a first position remote from said releasable means to a second position wherein said linking component operably engages said releasable means.

11. The invention of claim **10,** wherein said releasable means includes a rotatable spacing means, said linking component being provided with a transversely extending slot means slidably receiving a laterally projecting pin means provided on said spacing means when said linking component is shifted to said second position for operably engaging said linking component with said releasable means.

12. The invention of claim **10,** wherein said control means includes shiftable linkage means pivotally mounted on said base means for swinging movement relative to the base means when actuated, and operating bar means swingably mounted on said base means and extending along the length of said path of travel in juxtaposition to said path of travel, one side of said operating bar means being in engagement with and carried by said shiftable linkage means for swinging movement of the operating bar means when said shiftable linkage means is swung, the opposite side of said operating bar means being slidably engaged by said operating sensor for shifting said sensor and swinging said linking component at any position of said carriage means along the path of travel when said shiftable linkage means is swung.

13. The invention of claim **10,** wherein guide means are provided on said carriage means for securing said linking component in said second position during rotation of said spacing means.

14. The invention of claim **13,** wherein said guide means include hook means on said linking component extending upwardly therefrom and received within a generally L-shaped slot having a first, horizontal portion and a second, downwardly slanting portion, said hook means being shifted along said second portion as said linking component is shifted to said second position, and shifted along said first portion and supported thereby during said reciprocable movement of the linking component.

15. In an imprinting device:

base means;

support means on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel juxtaposed with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operably coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means including platform means slidably mounted on said base means for swinging movement toward said support means while shifting with said carriage means along said path,

said drive means being shiftably mounted on said carriage means for movement relative to the latter during shifting of said carriage means along said path,

said operating means including an elongated, swingable crank component securely attached to said platform means and extending laterally therefrom and an elongated, shiftable linking component pivotally coupled adjacent one end thereof with said crank component and operably engageable with said releasable means for reciprocable movement of said linking component along is longitudinal axis and swinging movement of said crank component about the pivotal axis of said platform means when the drive means is shifted whereby said platform means is swung toward said support means.

16. The invention of claim **15,** wherein said advancing means includes a coil spring carried by said carriage means and operably coupled with said drive means for shifting the latter, whereby said linking component is reciprocated along its longitudinal axis.

17. In an imprinting device:

base means;

support means horizontally mounted on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel horizontally disposed in juxtaposition with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means

is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means being provided with a plurality of character imprinting elements thereon adapted to engage said item and to imprint a plurality of characters on said item,

said imprinting means including:

platform means shiftably mounted on said base means adjacent an extremity of the platform means proximal said support means for movement toward and away from said support means about an axis of rotation parallel with said path of travel while shifting in said one direction along said path with said carriage means;

head means rotatably mounted on said platform means for rotation about a vertical axis and having an outer arcuate surface generally facing said support means and concentric with the axis of rotation of said head means,

said imprinting elements being horizontally spaced on said arcuate outer surface;

spin means operably coupled with said head means and said carriage means for rotating the head means as said platform means and said head means shift relative to said carriage means toward and away from said support means, and

spin selection means on the carriage means operably engageable with said head means and said control means for holding the head means against rotation at a predetermined position wherein one of said elements is disposed in an imprinting position whereby said one element is adapted to engage said item,

said spin means including a shaft means rotatably mounted on said platform means having an annular gear means transversely on one end of the drive shaft complementally engaging an arcuate gear track on said carriage means extending in the direction of swinging of said shaft means as the latter swings with said platform means toward said support means for rotating said shaft means during said swinging of the latter and said platform means and a bevel gear means on the other end of the shaft means comple-mentally engaging a second bevel gear means on said head means for rotating the latter about its vertical axis as said shaft means is rotated,

said spin means being provided with yieldable means for permitting rotation of said annular gear means on the arcuate gear track while said head means is held against rotation by the spin selection means thereby allowing said platform and head means to swing toward said support means unimpeded by said spin selector means.

18. In an imprinting device:

base means;

support means horizontally mounted on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel horizontally disposed in juxtaposition with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said done direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means being provided with a plurality of character imprinting elements thereon adapted to engage said item and to imprint a plurality of characters on said item,

said imprinting means including:

platform means shiftably mounted on said base means for movement toward said support means while shifting in said one direction along said path with said carriage means;

head means rotatably mounted on said platform means for rotation about a vertical axis and having an outer arcuate surface generally facing said support means concentric with the axis of rotation of said head means,

said imprinting elements being horizontally spaced on said arcuate outer surface;

spin means operably coupled with said head means and said carriage means for rotating the head means as said platform means and said head means shift relative in said carriage means toward and away from said support means; and

spin selection means on the carriage means operably engageable with said head means and said

control means for holding the head means against rotation at a predetermined position wherein one of said elements is disposed in an imprinting position whereby said one element is adapted to engage said item,

said spin selection means including sector wheel means on said head means, a spin sensor shiftably mounted on said operating means for movement to a predetermined position wherein the sensor engages said sector wheel means for holding said head means against rotation, and shiftable intermediate means operably coupled with said platform means and responsive to the swinging movement of the latter for shifting said spin sensor into said sector wheel means when actuated by said control means.

19. The invention of claim **18,** wherein said intermediate means includes a horizontal rod means pivotally mounted on said base means between said carriage means and said support means extending generally parallel to and juxtaposed with the latter, said rod means being operably coupled with the platform means for rotation of the rod means during the swinging of said platform means and said head means toward said support means, and elongated generally U-shaped bracket means yieldably connected to said rod means and juxtaposed therewith for swinging movement of said bracket means about the rod means as the latter rotates during swinging of the platform and head means, said bracket means being engageable on one side thereof with said control means at a predetermined position along said swinging movement for holding said bracket means against further swinging movement in a direction corresponding to the swinging of said head and platform means toward said support means.

20. The invention of claim **19,** wherein said spin sensor includes an elongated rod pivotally mounted between its ends on said operating means and having one end thereof adjacent to and spaced from said sector wheel means with the other end thereof engaging said bracket means on the opposite side thereof for swinging said one end of the spin sensor relative to said platform means into said sector wheel means when said bracket means engages the control means and is held thereby as said platform and head means swing toward the support means; said sector wheel means beings securely attached to said head means perpendicularly of said axis of rotation of the latter adjacent said platform means and having radially outwardly extending gear teeth, one for each element position in said row of imprinting elements on the head means.

21. The invention of claim **19,** wherein said bracket means is tapered in width from one end to the other thereby permitting said bracket means to swing through selectable distances before engaging said control means and said head means to rotate to selectable positions, wherein varying elements may be disposed in said imprinting position, the amount of rotation of said head means and swinging of said bracket means while said head and platform means swing toward said support means being in direct correspondence to the position of engagement of said control means along the length of said bracket means.

22. The invention of claim **19,** wherein said control means includes shiftable linkage means pivotally mounted on said base means for swinging movement relative to the base means when actuated, and a stop piece pivotally mounted on said shiftable linkage means and extending laterally therefrom having a first surface for engaging said bracket means and holding the latter against swinging in a direction corresponding to the swinging of said platform means and said head means toward the support means when said shiftable linkage means is shifted, and an arcuate, second surface opposed to said first surface for yieldably engaging said bracket during swinging of the latter in the opposite direction when said shiftable linkage is shifted.

23. In an imprinting device:

base means;

support means horizontally mounted on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including

carriage means shiftable relative to said base means along a path of travel horizontally disposed in juxtaposition with said support means, and

imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operably coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means being provided with a plurality of character imprinting elements thereon adapted to engage said item and to imprint a plurality of characters on said item,

said imprinting means including:

platform means shiftably mounted on said base means for movement toward said support means while shifting in said one direction along said path;

head means shiftably mounted on said platform means and having an arcuate outer surface generally facing said support means with a generally vertical extending axis of curvature, said imprinting elements being spaced vertically along said arcuate outer surface;

elevation means operably coupled with said head means and said platform means for reciprocating said head means toward and away from said platform means in a direction generally parallel with the axis of curvature of said arcuate surface as said platform means and said head means shift toward and away from said support means; and

elevation selection means on the carriage means for holding said head means against said shifting movement relative to the platform means at a predetermined position spaced from said platform means wherein one of said elements is disposed in a position to engage and imprint said item,

said platform means being swingable mounted on said base means for swinging movement toward and away from said support means about an axis of rotation parallel with said path of travel,

said elevation means including an elongated link pivotally mounted on said carriage means and extending generally toward said support means for vertical swinging movement relative to said carriage means,

said link being yieldably coupled with said platform means at a point on said link intermediate its pivotal point of connection with said carriage means and one end of the link adjacent said support means for swinging said link relative to said carriage means as said platform means and said head means are swung toward the support means,

said one end of the link being operably coupled with said head means for shifting the latter toward and away from said platform means as said link is swung relative to the carriage means during swinging movement of said platform means and said head means.

24. The invention of claim **23**, wherein said head means is provided with an elongated slot therein adjacent said link and extending perpendicularly of the axis of curvature of said arcuate outer surface thereof slidably receiving pin means perpendicularly disposed on said one end of the link for operably coupling said link with said head means.

25. In an imprinting device:

base means;

support means horizontally mounted on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel horizontally disposed in juxtaposition with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means being provided with a plurality of character imprinting elements thereon adapted to engage said item and to imprint a plurality of characters on said item,

said imprinting means including:

platform means shiftably mounted on said base means for movement toward said support means while shifting in said one direction along said path;

head means shiftably mounted on said platform means and having an arcuate outer surface generally facing said support means with a generally vertically extending axis of curvature, said imprinting elements being spaced vertically along said arcuate outer surface;

elevation means operably coupled with said head means and said platform means for reciprocating said head means toward and away from said platform means in a direction generally parallel with the axis of curvature of said arcuate surface as said platform means and said head means shift toward and away from said support means; and

elevation selection means on the carriage means for holding said head means against said shifting movement relative to the platform means at a pre-determined position spaced from said platform means wherein one of said elements is disposed in a position to engage and imprint said item,

said elevation selection means including a stop mechanism pivotally mounted on said framework and operably coupled with said head means for swinging said mechanism in one direction relative to the carriage means as said head means is shifted away from said platform and an elongated elevation sensor shiftably mounted on said carriage means and operably engageably with said control means for shifting said sensor into engagement with said mechanism when the latter has swung to a predetermined position along its swinging movement corresponding to a predetermined elevation of said head means from said platform means whereby sad mechanism is held against further swinging movement, said head means is held against further shifting movement from the platform means, and a selected element on said head means is disposed in said imprinting position.

26. The invention of claim 25, wherein said platform means is swingably mounted on said base means for swinging movement toward and away from said support means about an axis of rotation parallel with said path of travel; said elevation means including an elongated link pivotally mounted intermediate its ends on said carriage means and operably coupled adjacent one end thereof with said head means for vertical swinging movement relative to the carriage means as said head means is shifted away from said platform means, the other end of said link being in engagement with a horizontal surface on said stop mechanism for swinging the latter in said one direction relative to the carriage means as said link is swung relative to the carriage means during the shifting of said head means away from the platform means.

27. The invention of claim 25, wherein said mechanism is provided with a plurality of notches spaced along an extremity of said member presenting a plurality of spaced stop surfaces for engaging the elevation sensor at varying positions along the swinging movement of said mechanism, said elevation sensor being elongated and provided with a tab at one end thereof adjacent said stop mechanism and extending laterally from said sensor toward the stop mechanism for engaging said stop surfaces, the other end of said elevation sensor being engageable with said control means for shifting said sensor when actuated to selectable positions, wherein said tab may engage one of said stop surfaces corresponding to a predetermined position along said swinging movement of said member.

28. The invention of claim 27, wherein said control means includes shiftable linkage means pivotally mounted on said base means for swinging movement relative to the base means when actuated, and elevation bar means swingably mounted on said base means and extending along the length of said path of travel in juxtaposition therewith, one side of said elevation bar means being in engagement with and carried by said shiftable linkage means for swinging movement of the elevation bar means when said shiftable linkage means is swung, the opposite side of said bar means being slidably engaged by said spacing sensor for shifting said sensor into engagement with selected stop surfaces in said mechanism at any position of said carriage means along the path of travel when said shiftable linkage means is shifted.

29. The invention of claim 28, wherein said control means includes upper case actuation means; said elevation bar means including an elongated central portion rotatably mounted on said elevation bar means and having a substantially greater transverse dimension in one direction than in another direction perpendicular thereto for shifting said elevation sensor to engage a second successive stop surface independently of the swinging of said shiftable linkage means when said central portion is rotated by said upper case actuation means.

30. The invention of claim 28, wherein a plurality of control means are provided, said shiftable linkage means of at least one of said control means being provided with recess means therein for receiving said elevation bar means when said shiftable linkage means is swung, thereby preventing said shiftable linkage means from shifting said elevation sensor as said shiftable linkage means is swung.

31. In an imprinting device:

base means,

support means horizontally mounted on the base means for holding an item to be imprinted;

shiftable means mounted on said base means including carriage means shiftable relative to said base means along a path of travel horizontally disposed in juxtaposition with said support means, and imprinting means shiftable relative to said carriage means and shiftable with the carriage means relative to said base means;

advancing means operably coupled with said carriage means for continuously urging the same in one direction of shifting along said path of travel;

releasable means for releasably holding the carriage means against movement in said one direction relative to the base means;

drive means on the carriage means interconnecting the advancing means and the releasable means and operably coupled with the base means, said drive means being actuatable when the releasable means is released to cause the advancing means to move the carriage means relative to the base means;

operating means for operably coupling the drive means with the imprinting means for shifting the imprinting means toward the support means when the drive means are actuated; and

control means on the base means operably coupled with said releasable means and said operating means for simultaneously releasing said releasable means and effecting operable coupling of said drive means with said imprinting means, whereby said advancing means will concurrently cause said carriage means to travel in said one direction relative to the base means and said operating means to shift said imprinting means toward said support means,

said imprinting means being shiftably mounted on the base means for shifting movement toward the support means while being shifted with said carriage means in said direction along said path,

said imprinting means being provided with a plurality of character imprinting elements thereon adapted to engage said item and to imprint a plurality of characters on said item,

said imprinting means including:

platform means shiftably mounted on said base means for movement toward said support means while shifting in said one direction along said path;

head means shiftably mounted on said platform means and having an arcuate outer surface generally facing said support means with a generally vertically extending axis of curvature, said imprinting elements being spaced vertically along said arcuate outer surface;

elevation means operably coupled with said head means and said platform means for reciprocating said head means toward and away from said platform means in a direction generally parallel with the axis of curvature of said arcuate surface as said platform means and said head means shift toward and away from said support means; and

elevation selection means on the carriage means for holding said head means against said shifting movement relative to the platform means at a predetermined position spaced from said platform means wherein one of said elements is dis-

posed in a position to engage and imprint said item,

said drive means being shiftably mounted on said carriage means for movement relative to the latter during shifting of said carriage means along said path,

said operating means being operably engageable with said actuating means for shifting the platform means toward the support means when the drive means is shifted,

said advancing means including a coil spring carried by said carriage means and operably coupled with said drive means for shifting the latter whereby said platform means is shifted toward said support means while shifting with said carriage means in said one direction along said path of travel,

said head means including a cylindrical-shape body having a generally vertical axis of curvature with imprinting means being disposed in spaced, horizontal and vertical rows around the exterior surface of said body,

said body being operably coupled with said elevation means and provided with a key-shaped opening means longitudinally therethrough complementally receiving an upstanding post means rotatably mounted on said platform means and operably coupled with said spin means and said spin selection means for rotating said body with the post means while said body shifts longitudinally of the post means,

said platform means being pivotally mounted on said base means adjacent an extremity of the platform means proximal to said support means for swinging movement toward and away from said support means about an axis of rotation parallel with said path of travel, said drive means including gear means rotatably mounted on said carriage means and operably coupled with a rack on said base means for shifting said carriage means in said one direction along said path as said gear means is rotated,

said advancing means including a coil spring carried by the carriage means and operably coupled with said gear means for rotating the latter,

said releasable means including a spacing means rotatably mounted on said carriage means and operably coupled with said gear means for rotation with the latter when said releasable means is released,

said operating means including an elongated crank component securely attached to said platform mean, and an elongated linking component pivotally attached at one end thereof to said crank component and operably engageable with said spacing means for reciprocable movement of said linking component along its longitudinal axis as said spacing means is rotated whereby said platform means and said head means are swung toward and away from said support means during the shifting of said carriage means in said one direction along said path.

32. In an imprinting device:

support means said holding an item to be printed;

carriage means reciprocably shiftable along a path of travel juxtaposed with said support means;

imprinting means shiftable relative to said carriage means to perform a printing operation upon said item and shiftable with said carriage means relative to said support means for letterspacing purposes; and

advancing means for said carriage means and said imprinting means operably coupled therewith for shifting said carriage means in a letterspaced direction along said path and shifting said imprinting means relative to said carriage means and said support means to perform a printing operation, said advancing means consisting of a single spring,

said advancing means being coupled with said carriage means for receiving and storing energy in said advancing means during shifting of the carriage means in a return direction opposite to that of said letterspacing direction,

said advancing means being selectively and repeatedly actuatable to release said stored energy for the simultaneous shifting, during traverse of each space of a line of print, of said carriage means in said advancing direction and said imprinting means relative to said carriage means and said support means to imprint a line of print, a character at a time, on said item as said carriage means and said imprinting means advance in said letterspacing direction along said path of travel.

33. The invention of claim **32,** wherein is provided selectively operable means coupled with said carriage means for shifting said carriage means in said return direction.

34. In an imprinting device:

support means for holding an item to be printed;

carriage means reciprocably shiftable along a path of travel juxtaposed with said support means;

imprinting means shiftable relative to said carriage means to print upon said item and shiftable with said carriage means relative to said support means for letterspacing purposes;

advancing means common to said carriage means and said imprinting means and operably coupled therewith for shifting said carriage means in an advancing direction along said path and shifting said imprinting means relative to said carriage means and said support means to print upon said item during traverse of said carriage along said path; said advancing means consisting of a single resilient member which stores energy during carriage return motion; and shiftable control means operable when actuated for causing said advancing means to effect said shifting of said carriage means and said imprinting means, said shifting of said carriage means and said imprinting means occurring concurrently to imprint a line of print upon said item, a character at a time.

35. The invention of claim **34,** wherein said advancing means provides a constant bias in said advancing direction upon the carriage means.

36. The invention of claim **34,** wherein there is provided releasable carriage spacing means engageable and releasable by said control means, said spacing means being operably interconnected with said advancing means to cause the latter to be actuated upon the release of the spacing means by said control means.

37. The invention of claim **36,** wherein said carriage means is operably coupled with said spacing means, said imprinting means is operably coupled with said spacing means upon operation of said control means, and said advancing means is drivingly coupled with said spacing means, whereby said carriage means and said

imprinting means are simultaneously shifted by said advancing means when said spacing means is released by said control means.

38. The invention of claim **34,** wherein said imprinting means includes an imprinting head selectively rotatable in coordination with and in response to said actuation of the advancing means and simultaneously with said shifting of said carriage means and said imprinting means.

39. The invention of claim **38,** wherein said imprinting head is selectively movable relative to said carriage means along a linear, additional path of travel in coordination with and in response to said actuation of the advancing means and simultaneously with said shifting of said carriage means and said imprinting means.

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