

### [54] BI-DIRECTIONAL IMPRINTER

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[52] U.S. Cl. .... 101/269

[51] Int. Cl. .... B41f 3/04

[58] Field of Search ..... 101/269-274,  
101/45, 56

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### [57]

### ABSTRACT

An imprinter according to the present disclosure comprises a carriage nested between a pair of parallel longitudinal rails having upper and lower track surfaces. Wheels on the carriage bear against the lower track surface during an imprinting stroke so that mechanical forces created by the reaction of roller platens supported by the carriage bearing against a sheet or sheet set overlying printing plates are transferred to the wheels and lower track surface. One feature of the apparatus resides in the fact that an imprinting stroke may be accomplished upon movement of the carriage in either direction between the ends of the base. Another feature of the apparatus is a latch mechanism to lock the carriage at a rest position at either end of the base. Yet another feature of the apparatus resides in the provision of separately mounted roller platens to bear against the sheet being imprinted at the region of each of individual ones of a plurality of printing plates; an example being two separate roller platens to imprint from a dealer's plate and a credit card, respectively.

16 Claims, 12 Drawing Figures

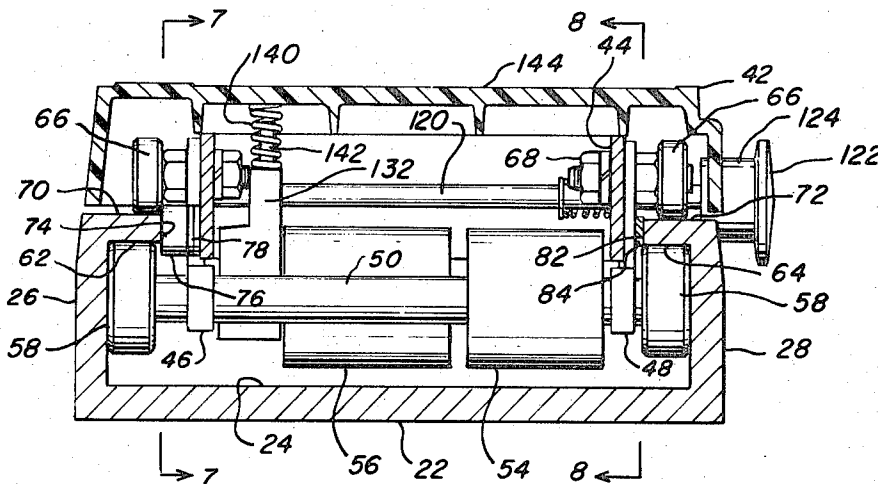


FIG. 1

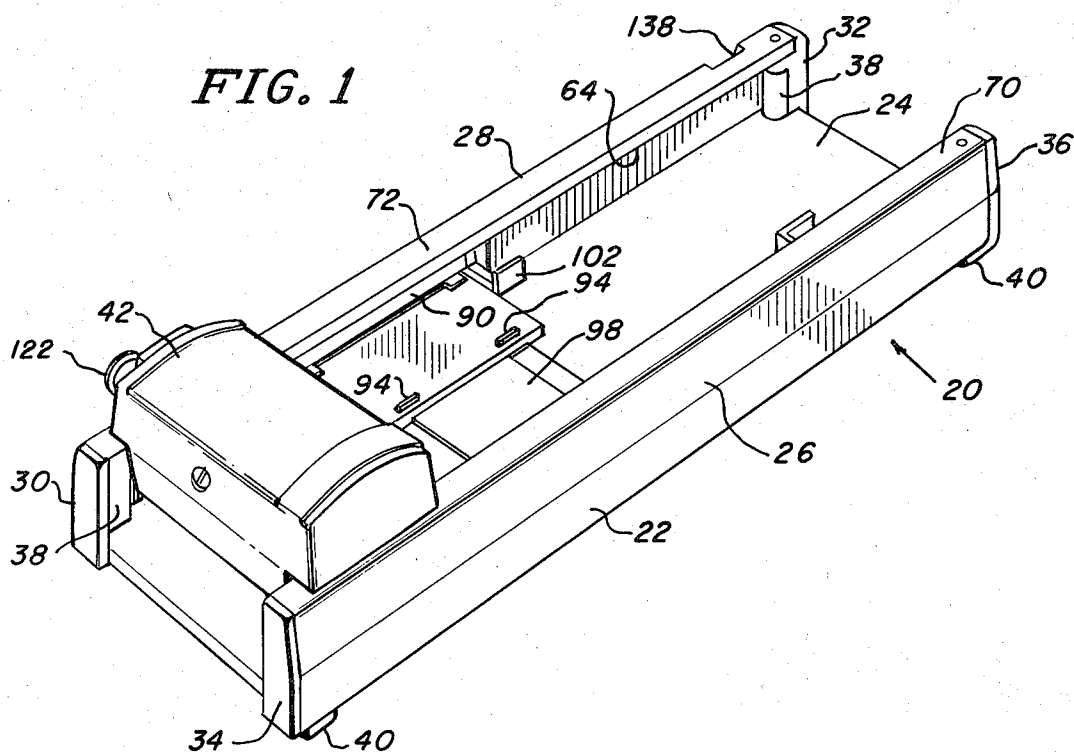


FIG. 2

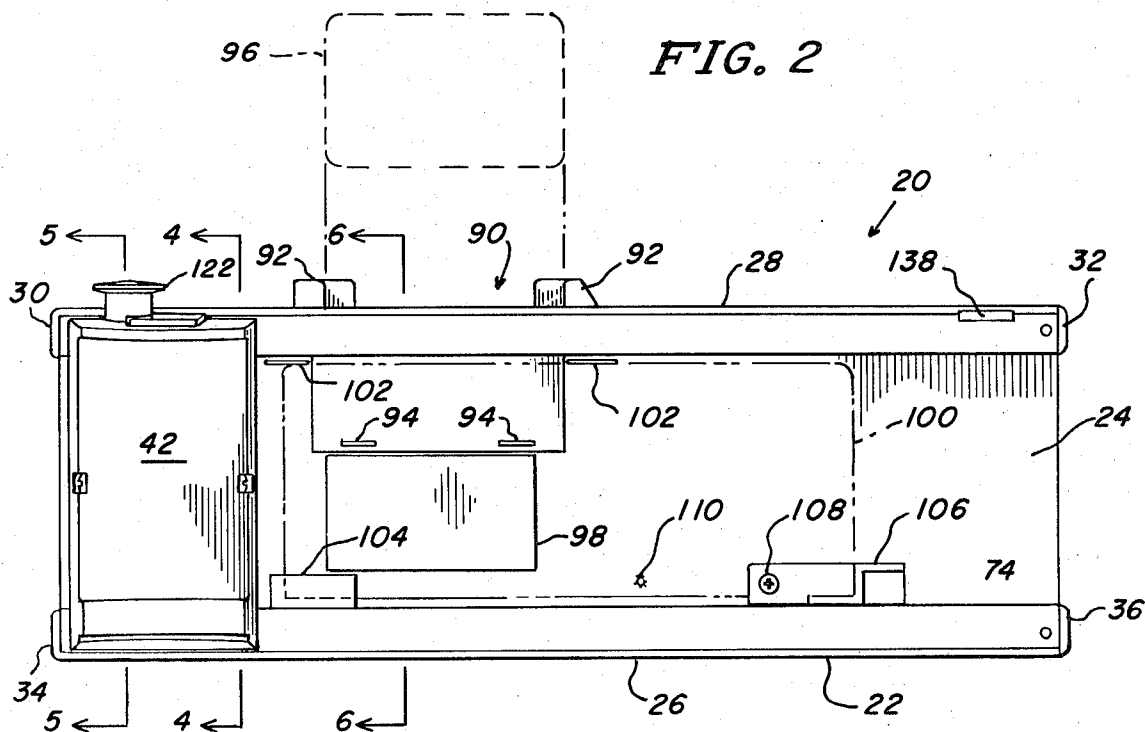




FIG. 6

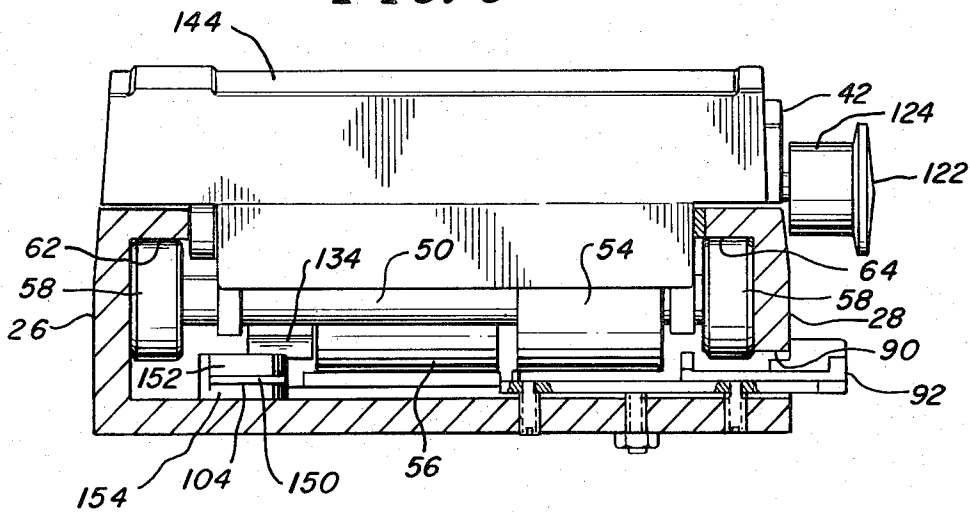


FIG. 10

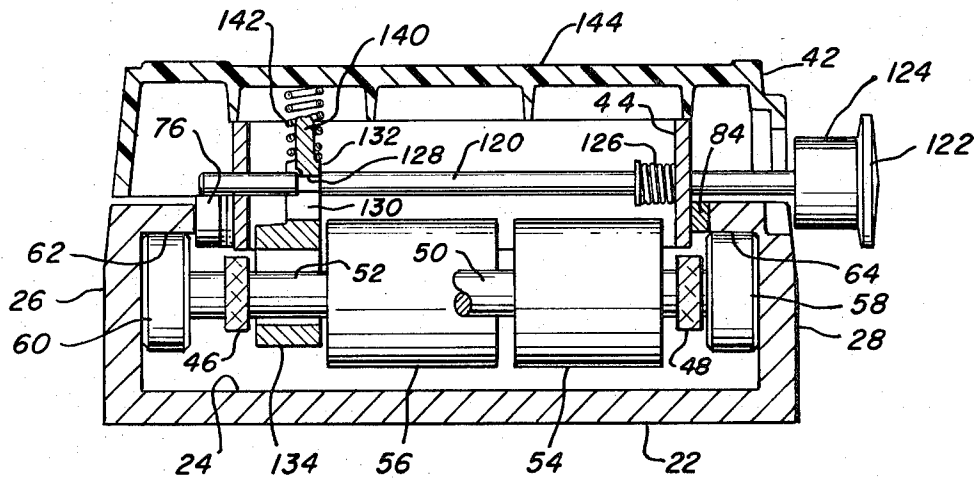


FIG. 9

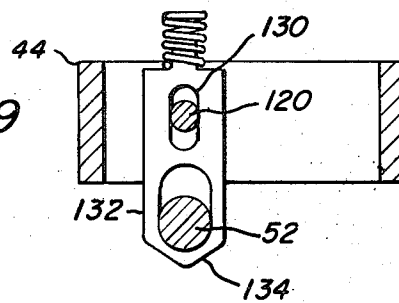


FIG. 7

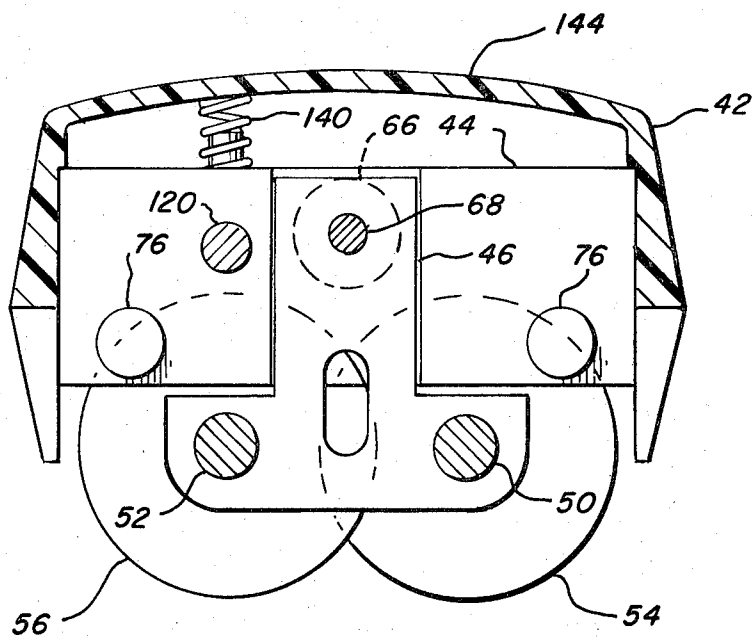


FIG. 8

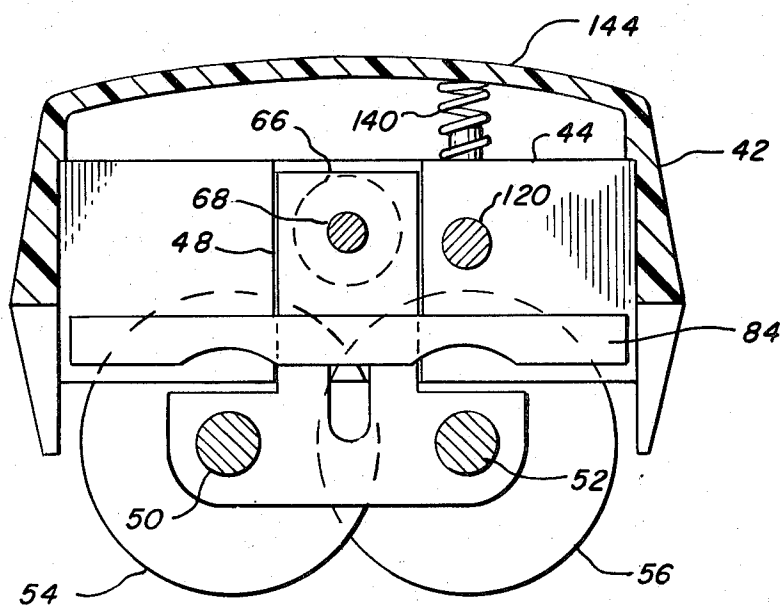


FIG. 11

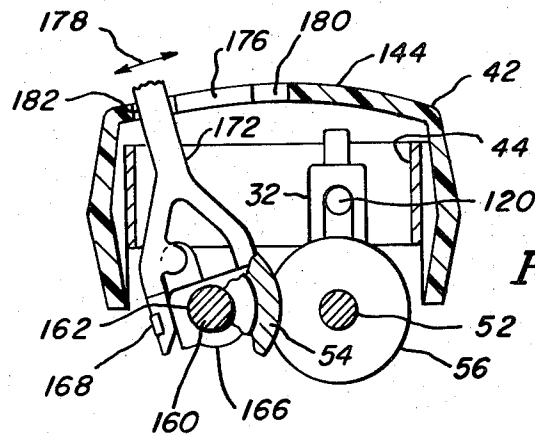
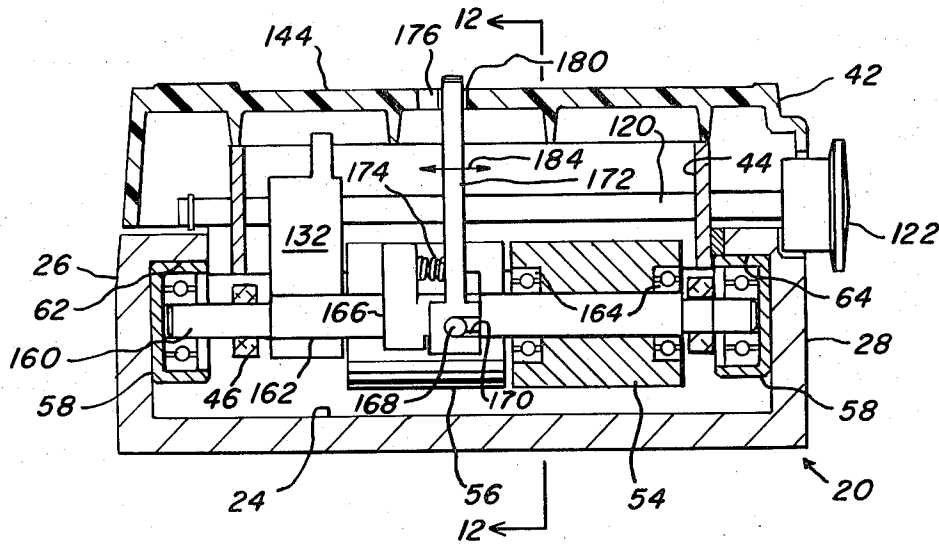


FIG. 12

**BI-DIRECTIONAL IMPRINTER**

This invention relates to imprinters, and particularly to rolling platen imprinters employing print plates for forming character impressions on one or more sheets.

Rolling platen imprinters have enjoyed wide-spread use and acceptance by merchandisers in connection with credit sales of goods and services. Such imprinters ordinarily employ a bed capable of supporting print means, such as a fixed or portable printing plate and/or a set of movable print figures. A sheet or set of sheets to be imprinted is placed on the bed over the print means and a rolling platen is passed over the assemblage to imprint characters on the sheets by bearing against the sheets. An example of such a rolling platen imprinter may be found in my prior U.S. Pat. No. 3,538,848, granted Nov. 10, 1970.

In a typical application of a rolling platen imprinter, a credit card having raised character surfaces is placed on the bed juxtapositioned a fixed printing plate, such as a dealer's plate also containing raised character surfaces. The raised character surfaces of the credit card might, for example, include the name of the customer and a credit number, while the raised characters of the dealer's plate might reflect information relating to the identity of the dealer making the credit sale. A sheet or sheet set containing suitable carbon and/or inked portions is placed over the print plates, and the rolling platen is moved across the assemblage, through its imprint stroke, to imprint the information depicted by the raised character surfaces of the printing plates onto the sheets or sheet set.

Rolling platen imprinters must be rugged and capable of withstanding abuse in the field, and yet be reliable and require minimal field adjustments. Further, such imprinters should require a minimum of space and must be virtually tamper proof. One problem associated with prior rolling platen imprinters resides in the fact that minor differences in the height of character surfaces on credit cards and on dealer's plates caused an uneven application of imprinting pressure by the rolling platen, thereby causing faint or unsatisfactory imprinting. Thus, when the rolling platen was applied to both the credit card and the dealer's plate, the printing plate containing the characters having the greatest height biased the rolling platen in such a manner that characters printed from the plate having the lower characters were faint or nonexistent and not of sufficient quality. Consequently, the dealer often had to write the credit card information directly onto the credit slip thereby subverting the purpose of the imprinter. Further, some dealers placed shims under the dealer's plate to enhance the quality of print from that plate, but at a sacrifice of the quality of print from the credit card.

It is an object of the present invention to provide a rolling platen imprinter capable of imprinting bold characters of good quality regardless of any differences in height in the raised character surfaces of different printing plates.

Another object of the present invention is to provide a rolling platen imprinter having a relatively low profile, thereby requiring a minimum of space.

Another object of the present invention is to provide a rolling platen imprinter having a relatively simple design which is rugged and not subject to variations in adjustments upon extended field use.

In accordance with the present invention a rolling platen imprinter is provided having a platen bed disposed between a pair of mutually parallel rails. The rolling platen is supported by a housing and capable of tracking on the rails. Particularly, the rolling platen housing is nested between the rails so that wheels associated with the rolling platen housing track the underside of the rails, thereby affording a relatively low profile.

One feature of the present invention resides in the fact that complete imprinting operation is achieved upon movement of the roller platen housing in either direction across the printing plates.

Another feature of the present invention resides in the fact that complex levers necessary to alter the rolling platen height upon a return stroke, as embodied in prior imprinters, are eliminated.

Another feature of the present invention resides in the provision of a plurality of rolling platens supported on separate shafts to separately imprint data from separate printing plates supported on the platen bed. Thus, minor differences in height of the character planes on the separate printing plates do not affect print quality.

Another feature of the present invention resides in the provision of a plurality of platen rollers supported on individual resilient shafts, so that the imprinter is capable of handling documents of various thicknesses and printing plates of varying character heights.

Another feature of the present invention is the provision of adjustable locating means for locating the position of documents to be imprinted so that the imprinter may imprint on documents of various sizes.

Another feature of the present invention resides in the provision of a latch mechanism for locking the rolling platen housing in either of two rest positions at opposite ends of the bed.

Another feature of the present invention resides in the provision of manually-operable means for selectively adjusting the relative position of one or more rolling platens with respect to the bed and with respect to other rolling platens.

The above and other features of this invention will be more fully understood from the following detailed description and the accompanying drawings, in which:

FIG. 1 is a perspective view of an imprinter according to the presently preferred embodiment of the present invention;

FIG. 2 is a top view of the imprinter illustrated in FIG. 1;

FIG. 3 is a rear view of the imprinter illustrated in FIGS. 1 and 2;

FIG. 4, 5 and 6 are section views taken along lines 4—4, 5—5, and 6—6, respectively, in FIG. 2;

FIGS. 7 and 8 are section views taken along lines 7—7 and 8—8, respectively, in FIGS. 4 and 5;

FIG. 9 is a section view illustrating part of a lock mechanism for the imprinter illustrated in FIGS. 1—8;

FIG. 10 is a section view, as in FIG. 5, with the locking mechanism in a different position; and

FIGS. 11 and 12 are section views of part of the imprinter showing a modified rolling platen arrangement for adjusting the relative position of a selected rolling platen, FIG. 12 being taken at line 12—12 in FIG. 11.

Referring to the drawings, there is illustrated an imprinter 20 in accordance with the presently preferred embodiment of the present invention. Imprinter 20 includes a base 22, constructed of suitable metal, such as aluminum extrusion, forming a relatively flat bed 24. Substantially parallel rails 26 and 28 extend upwardly from bed 24 and longitudinally along the length of base 22. Suitable end plates 30, 32, 34, 36 enclose the ends of rails 26 and 28, and support stops 38. Preferably, feet 40 are provided to support base 22 on a platform (not shown) such as on a table or desk top.

Carriage 42 includes a housing 44 having T-shaped brackets 46 and 48 mounted to opposite sides thereof. Axles 50 and 52 are journaled to brackets 46 and 48. Rolling platen 54 is journaled to axle 50 while rolling platen 56 is journaled to axle 52. A pair of roller wheels 58 are journaled to axle 50 while a pair of roller wheels 60 are journaled to axle 52. One of each pair of wheels 58 and 60 are positioned to bear against respective one of track surfaces 62 and 64 of rails 26 and 28.

Another pair of roller wheels 66 are journaled to opposite sides of housing 44 by suitable fasteners and journals 68 in such a position as to bear against respective tracks 70 and 72 or rails 26 and 28, respectively.

As shown particularly in FIGS. 4 and 7, self lubricating plastic wear buttons 76 are mounted to housing 44 to bear against surface 74 or rail 26. Spacers 78 may be mounted behind buttons 76 to fixedly position the carriage with respect to rail 26. A suitable shim 84 is mounted to the opposite side of frame 44 (see FIGS. 4 and 8) to bear against surface 82 of rail 28.

In the assemblage of the carriage as thus far described, brackets 46 and 48 are mounted to housing 44 and the shafts, platens and wheels are mounted to the brackets. Wheels 58 and 60 are mounted to their respective axles which are journaled to brackets 46 and 48 so that wheels 58 and 60 bear against tracks 62 and 64. Wheels 66 are thereafter journaled to brackets 46 and 48 and are adjusted to bear against tracks 70 and 72. Preferably, wheels 66 are eccentrically mounted to brackets 46 and 48 to permit their adjustment. The position of carriage 42 with respect to the width of bed 24 is adjusted by snugly positioning shim 84 against surface 82 of rail 28. Thereafter, buttons 76 are positioned so that they bear against surface 74 of rail 26.

Referring to FIGS. 1-3 and 6, rail 28 of base 24 includes a suitable slot 90 to permit insertion of a credit card or the like into the region established by brackets or guides 92 and 94. When nested in the region defined by brackets 92 and 94 a credit card, such as the credit card 96 shown in dashed lines in FIG. 2, is positioned so that the raised character surfaces of the credit card protrude upwardly from bed 24. Preferably a suitable dealer's plate 98, or the like, having raised character surfaces (not shown), is fixedly mounted to bed 24. A sheet or sheet set, preferably impregnated with a suitable inking mechanism, such as shown by dashed lines 100, is positioned between fixed brackets or guides 102 and 104 and adjustable bracket or guide 106. Bracket 106 is pivotally mounted at 108 so as to be rotatable 180° from the position illustrated in FIG. 2. Hence, sheet sets of various sizes to be imprinted may be positioned on bed 24. Preferably, suitable stop mechanism 110 is provided for fixedly locating the position of bracket 106.

In operation of the imprinter as thus far described, credit card 96 is nested at a location juxtapositioned dealer's plate 98 on bed 24. A sheet or sheet set 100 to be imprinted is placed over credit card 96 and dealer's plate 98 on bed 24, and carriage 42 is laterally moved along rails 26 and 28. Initially, the forces associated with the weight and movement of carriage 42 is supported by wheels 66 bearing against upper tracks 70 and 72. However, when the carriage reaches the region of plates 96 and 98, rolling platen 54 bears against the region adjacent the raised character surfaces of plate 96 while rolling platen 56 bears against the region adjacent the raised character surfaces of plate 98. The reactive forces between the raised character surfaces on platen 96 and 98 against platens 54 and 56 is transferred to wheels 58 and 60 causing those wheels to bear against tracks 62 and 64. As the carriage is moved through the imprinting stroke, the data depicted by the raised character surfaces on plates 96 and 98 is imprinted onto sheet set 100. Thereafter, carriage 42 is moved to the opposite end of base 22 from that shown on the drawing. Stops 38 at each end of rails 26 and 28 provide a resilient stop mechanism for halting travel of carriage 42.

One feature of the invention resides in the fact that rolling platens 54 and 56 are mounted to separate axles 50 and 52, respectively. Thus, minor differences in the height of the character surfaces on plates 96 and 98 may be compensated by slight vertical movement of the platens due to the resilience or flexibility of axles 50 and 52. Hence, substantially equal pressure is applied to the sheet set in the region of each printing plate bearing raised character surfaces. Ordinarily, the resilience or flexibility of the axles is very small but differences of mere thousandths of an inch between the relative heights of raised character surfaces on the various printing plates may be compensated by minor flexing of axles 50 and 52.

Preferably, a suitable latch mechanism is provided to automatically lock the position of the carriage at its rest positions at opposite ends of base 22. This is accomplished by a shaft 120 slidably mounted to housing 44 and carrying, at one end thereof, a suitable manually-operable pull button 122. Pull button 122 includes a cylindrical portion 124 adapted to engage slots 136 and 138 or rail 28. Compression spring 126 is mounted to shaft 120 to bear against housing 44 so as to bias shaft 120 to the position shown in FIGS. 4 and 5. Shaft 120 includes a recessed portion 128 adapted to receive lip 130 of housing 132. Housing 132 is slidably mounted to axle 52 and shaft 120 to reciprocate vertically in a plane normal to the shaft's axles. A suitable cam surface 134 (FIG. 9) is provided to reciprocate housing 132.

In operation of the latch mechanism, when carriage 42 is at one end of base 22, spring 126 biases shaft 120 to the position illustrated in FIGS. 4 and 5 so that portion 124 is received in one of the other of slots 136 and 138. When positioned in a slot 136 or 138, portion 124 prevents lateral movement of carriage 42. However, upon operating pull button 122 to axially move shaft 120 to the position shown in FIGS. 6 and 10, portion 124 protrudes outwardly from the slot 136 or 138, and the shaft is moved to a position so that recess 128 is juxtapositioned lip 130. Housing 132 moves downwardly so that lip 130 is received in recess 128, preventing return of the shaft to its original position. Thereafter,



when carriage 42 is moved laterally along base 22, cam surface 134 of housing 132 cams against the upper surface of one of brackets 104 or 106 (See FIG. 6) thereby moving housing 132 upwardly so that lip 130 is moved out of the region of recess 128. Spring 126 biases shaft 120 to move axially to a position so that portion 124 tracks against the outside surface of rail 28. The lock mechanism remains in this position until carriage 42 is moved to a rest position at an end of base 22 so that portion 124 is juxtapositioned one or the other of slots 136 and 138. Spring 126 then biases shaft 120 so that portion 124 is biased into the slot 136 or 138, thereby preventing further lateral movement of carriage 42 until manual operation of pull button 122.

Housing 132 will reciprocate normal to axle 52 and shaft 120 by gravity when the imprinter is placed in a horizontal position, such as on a desk or table top. However, when the imprinter is to be used under conditions when gravity may not be relied upon to reciprocate housing 132, such as when the imprinter is mounted in a vertical position such as on a wall or the like, it may be necessary to utilize a bias spring 140 to bias housing 132 to its rest position shown in FIGS. 4 and 5. Conveniently, spring 140 may be compressed between a lip on housing 132 and cover 144 which serves as a cover assembly for the carriage of the imprinter. Conveniently, cover 144 may be fastened to housing 44 by suitable threaded fasteners 146.

Although the latch mechanism is shown utilizing a pull button extending from carriage 42 adjacent rail 28, it is to be understood that it may be more convenient in some cases to utilize a push button which mounted to shaft 120 outside of carriage 42 from the side adjacent rail 26, and flange portion 124 would be retained to engage slots 136 and 138.

One feature of the invention resides in a "gripping" bracket 104 for holding an edge of a sheet or sheet set 100 to be imprinted. This bracket, or guide is particularly useful in connection with sheet sets having a perforated portion for separating the sheet set after imprinting. Bracket 104 is an elongated bracket having a slot 150 disposed substantially parallel to bed 24 and formed between upper and lower lips 152 and 154. Preferably, portions of slot 150 are closed to provide edge walls against which edge surfaces of the sheet set are located. When a sheet set 100 is placed in slot 150 of bracket 104, lips 152 and 154 extend over the perforated portion of the sheet set thereby preventing the sheet set from bending, or otherwise buckling, at the perforations during an imprinting stroke.

FIGS. 11 and 12 illustrate a modification of the present invention wherein the vertical position of rolling platen 54 may be adjusted with respect to bed 24. In this arrangement, rolling platen 56 is journaled to axle 52 which is supported by wheels to track against tracks 62 and 64 of rails 26 and 28, as in the case of the apparatus shown in FIGS. 1-10. Likewise, the latch mechanism associated with shaft 120, housing 132 and pull button 122 is the same as in the apparatus shown in FIGS. 1-10. In this modification, however, axle 160 is journaled to brackets 46 and 48, and wheels 58 are journaled to axle 160 to bear against tracks 62 and 64. Axle 160 has an eccentric portion 162. Rolling platen 54 is journaled to eccentric portion 162 by journals 164.

Housing 166 is fixedly mounted to portion 162 and carries a pair of oppositely dispersed pins 168 which

engage slots 170 on a forked portion of handle 172. Compression spring 174 biases handle 172 from housing 166 to the position shown in FIG. 11. The upper portion of handle 172 extends through slot 176 in cover 144 and is capable of rotating as shown by arrow 178 in FIG. 12 between two rest positions defined by recesses 180 and 182 or slot 176. When at a rest position, spring 174 biases handle 172 into the respective rest position as shown by arrow 184 in FIG. 11.

In operation of the device shown in FIGS. 11 and 12, handle 172 is moved from one rest position 180, 182 in the direction of arrow 184 thereby sliding handle 172 along the axis of axle 160 with respect to housing 166. Compression spring 174 is further compressed. Handle 172 is then rotated about the axis of axle 160 as shown by arrow 178 until reaching the other rest position. Spring 174 then biases handle 172 into the respective recess 180, 182 to hold the handle in the desired axial position. As handle 172 is rotated, housing 166, being coupled to the handle by pins 168, rotates, thereby rotating axle 160 (fixed to housing 166). Rotation of axle 160 selectively elevates and lowers rolling platen 54 journaled to eccentric portion 162. Hence, the relative position of rolling platen 54 with respect to bed 24 is changed. It should be noted, however, that the position of the axis of axle 160 is not altered by this arrangement, so the position of wheels 58 with respect to the bed and tracks 62 and 64 remains unchanged.

The arrangement shown in FIGS. 11 and 12 is particularly useful for selectively raising and lowering rolling platen 54 to accommodate credit cards of various thicknesses, without affecting the position of the rolling platen 56 which bears against a fixed print plate, such as a dealer's plate.

The present invention thus provides an imprinter capable of imprinting upon lateral movement of the carriage in either direction along the base. Separate rolling platens are provided for each printing plate so that minor differences in the relative heights of raised character surfaces on the several printing plates do not affect the quality of characters imprinted onto the data sheets. Further, due to the nested arrangement of the carriage within the rails of the base, the arrangement has a minimum height thereby requiring minimal space.

The nested arrangement of the imprinter according to the present invention is achieved by mounting the rolling platens between the rails of the base portion and elimination of the complex raising and lowering mechanisms associated with prior imprinters for raising rolling platens upon return strokes and lowering them during an imprinting stroke. Further, since the imprinter according to this invention is capable of accomplishing an imprinting stroke upon movement of the carriage in either direction along the base, the imprinter has a longer field life and is subject to less abuse than prior imprinters.

The imprinter according to the present invention requires minimal adjustment and is reliable in operation. The imprinter provides good quality impressions imprinted onto data sheets so that the data transferred thereto may be read by suitable optical readers, common in the art.

One feature of the present invention resides in the fact that all mechanical loads occasioned during an imprinting stroke are supported by brackets 46 and 48 and the wheels and track surfaces. Thus, minor dimen-

sional variations in the carriage housing do not affect the dimensional relationships between the platens and the bed.

This invention is not to be limited by the embodiments shown in the drawings and described in the description, which are given by way of example and not of limitation, but only in accordance with the scope of the appended claims.

What is claimed is:

1. Imprinting apparatus for forming character impressions on a sheet comprising, in combination: a base member having a bed portion for supporting printing plate means of the class having raised character surfaces; first and second substantially parallel rail members extending along opposite sides of said base member and normal to said bed portion, each of said rail members having a flange portion forming upper and lower track means, said track means being positioned at predetermined locations to said bed portion; a carriage; support means mounted to said carriage; first wheel means journaled to said support means for engaging said lower track means and second wheel means journaled to said support means for engaging said upper track means so that said carriage is moveable in a direction substantially parallel to said rail members between a first rest position near one end of said base member and a second position near the opposite end of said base member, said bed portion being located at a region between said first and second rest positions; rotatable platen means journaled to said support means, said support means positioning said rotatable platen means in predetermined relation to said first wheel means; whereby said rotatable platen means is in predetermined spaced relation to said bed portion when said carriage is adjacent to said bed portion, said rotatable platen means being so disposed and arranged with respect to said bed portion as to bear against said sheet in the region of said printing plate means upon movement of said carriage in either direction between its first and second rest positions, and the major portion of the mechanical reaction to imprinting is supported by said first wheel means reacting against said lower track means of said rail members; and manually disengageable latch means for locking said carriage at its first rest position when said carriage is at its first rest position and for locking said carriage at its second rest position when said carriage is at its second rest position, said latch means including a shaft slideably supported by said carriage, said shaft being capable of reciprocating in a direction substantially perpendicular to the direction of movement of said carriage, a first slot in one of said rail members adjacent said first rest position and a second slot in said one of said rail members adjacent said second rest position, slot engaging means supported by said shaft for engaging said first slot when said carriage is at its first rest position and for engaging said second slot when said carriage is at its second rest position, and bias means for biasing said shaft to engage said slot engaging means to the respective one of said first and second slots when said carriage is in its respective one of said first and second rest positions.

2. Apparatus according to claim 1 wherein a substantial portion of said carriage is nested between said rail members.

3. Apparatus according to claim 2 wherein said rotatable platen means is axially supported by said support means between said rail members.

4. Apparatus according to claim 3 wherein the axis of said rotatable platen means is fixedly positioned between said rail members.

5. Apparatus according to claim 1 further including manually operable means supported by said shaft for disengaging said slot engaging means from the respective one of said first and second slots when said carriage is at its respective one of said first and second rest positions.

6. Apparatus according to claim 5 further including lock means for locking said shaft in a position to hold said slot engaging means disengaged from the respective slot upon operation of said manually operable means, and cam means on said lock means, said cam means being adapted to cam against a member on said base member to unlock said lock means when said carriage is moved through an imprinting stroke.

7. Apparatus according to claim 1 wherein said printing plate means comprises a plurality of individual printing plates of the class having raised character surfaces, said bed portion supporting said printing plates, said rotatable platen means comprising a plurality of individual roller platens each supported on an individual axle means, said axle means each being supported by said support means, said roller platens each being positioned to bear against a sheet to be imprinted at the region of the raised character surfaces of selected ones of said printing plates.

8. Apparatus according to claim 7 wherein at least one of said axle means is resilient, whereby when the respective roller platen bears against said sheet, the respective one axle means is capable of flexing to permit said respective roller platen to bear against the sheet with a substantially uniform pressure without regard to differences in relative heights of the raised character surfaces between individual ones of said printing plates.

9. Apparatus according to claim 8 wherein the axes of said roller platens are fixedly positioned by said support means between said rail members.

10. Apparatus according to claim 7 further including second manually-operable means for selectively adjusting the relative position of the axle means associated with at least one of said roller platens to said bed portion.

11. Apparatus according to claim 10 wherein the axle means associated with said second manually-operable means comprises an axle having an eccentric portion, at least part of said first wheel means being journaled to said axle to rotate about the axis of said axle, the said roller platen associated with said second manually-operable means being journaled to said eccentric portion, and means for rotating said axle about its axis.

12. Apparatus according to claim 11 wherein said last-named means includes manually-operable lever means for rotating said axle.

13. In an imprinter for forming character impressions on a sheet disposed over a printing plate of the class having raised character surfaces, said imprinter having a carriage supporting a roller platen, said carriage being journaled to a base member for movement along the base member through an imprinting stroke between a first rest position near one end of said base member and a second rest position near the opposite end of said base member, said base member having a bed portion supporting said printing plate and said sheet said bed portion being located at a region between said first and

second positions, said roller platen being adapted to bear against said printing plate and sheet upon movement of said carriage through its imprinting stroke, the improvement comprising: manually disengageable latch means for locking said carriage in its first rest position when said carriage is at its first rest position and for locking said carriage in its second rest position when said carriage is at its second rest position, said latch means including a shaft slideably supported by said carriage, a first slot in said base member adjacent said first rest position and a second slot in said base member adjacent said second rest position, slot engaging means supported by said shaft for engagement with said first slot when said carriage is at its first rest position and for engagement with said second slot when said carriage is at its second rest position, and bias means for biasing said shaft to engage said slot engaging means to the respective one of said first and second slots when said carriage is at its respective one of said first and second rest positions.

14. Apparatus according to claim 13 further including manually operable means supported by said shaft for disengaging said slot engaging means from the respective one of said first and second slots when said carriage is at its respective one of said first and second rest positions.

15. Apparatus according to claim 14 further including lock means for locking said shaft in a position to hold said slot engaging means disengaged from the respective slot upon operation of said manually operable means, and cam means on said lock means, said cam means being adapted to cam against a member on said base member to unlock said lock means when said carriage is moved through an imprinting stroke.

16. Apparatus according to claim 1 further including guide means supported on said bed portion for positionally locating said sheet, said guide means including means for holding said sheet to prevent bending of said sheet during an imprinting stroke.

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