

[54] **TRAVELING CYLINDER IMPRINTER
INCLUDING FLEXIBLE BAND
CYLINDER SUPPORT MEANS**

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Related U.S. Application Data

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[52] U.S. Cl. **101/269, 101/282**
[51] Int. Cl. **B41f 3/20**
[58] Field of Search **101/269, 252, 264, 282; 308/6**

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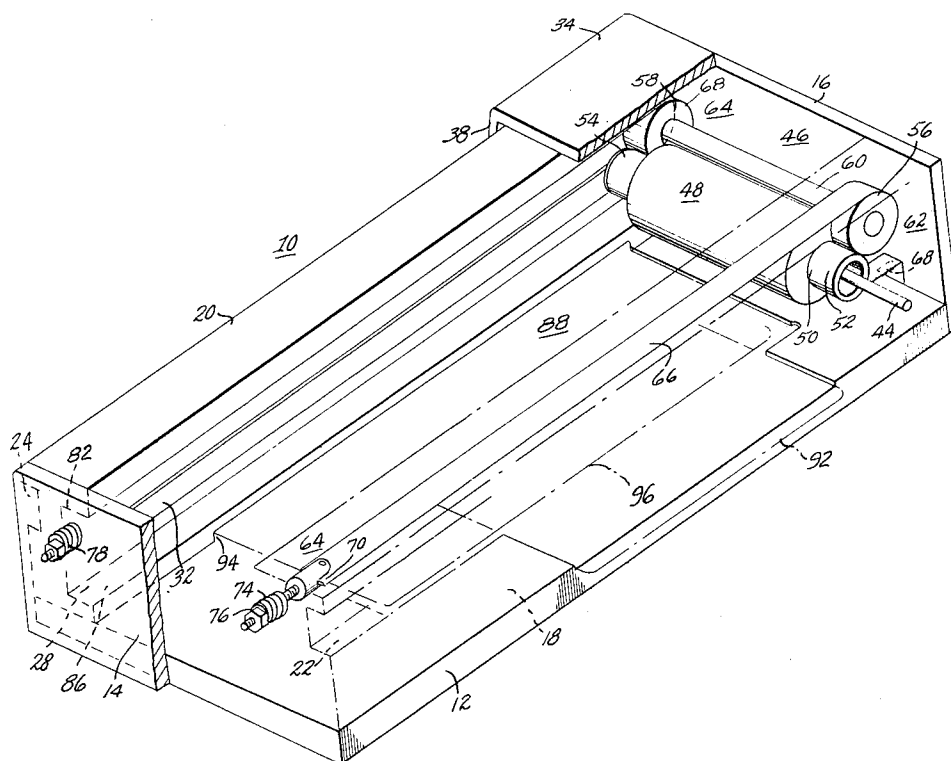
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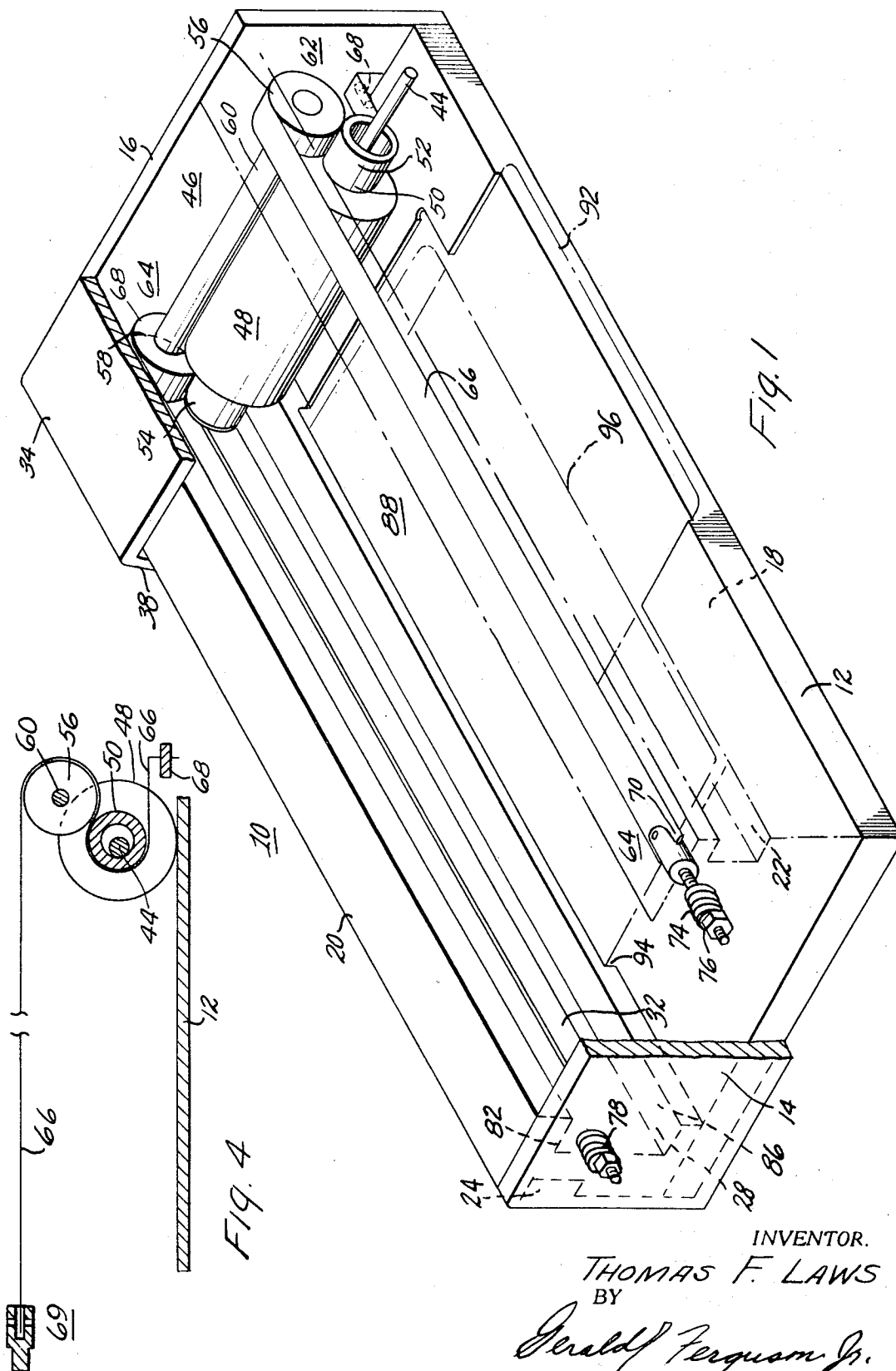
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[57] **ABSTRACT**

An imprinting device is disclosed wherein the imprinter roller assembly is loosely connected to the assembly carriage, the imprinter roller being supported at each end thereof by a roller cluster. Each roller cluster is supported by a flexible metal band, the band being fixedly connected at one end of the imprinter and adjustably connected at the other end thereof, each band being confined at the top and bottom thereof by a channel disposed along the imprinter length, the bottom of each channel being disposed above the upper surface of the print bed. Each band passes over and around one of the rollers of its associated roller cluster and then around and under the other roller of its associated cluster. The corresponding rollers of each cluster are connected together by appropriate means. The points where the bands are fixedly connected to one end of the imprinter are respectively disposed immediately above the bottoms of the above-mentioned channels. The print bed is provided with a recess for receiving the printing plate or card prior to the imprinting operation. A document or invoice is placed over the printing plate and onto the print bed. The documents and printing plate are respectively inserted through elongated apertures respectively disposed at opposite sides of the imprinting apparatus. In a modified embodiment of the invention, provision is made for imprinting more than one print field within the print bed area.

17 Claims, 6 Drawing Figures



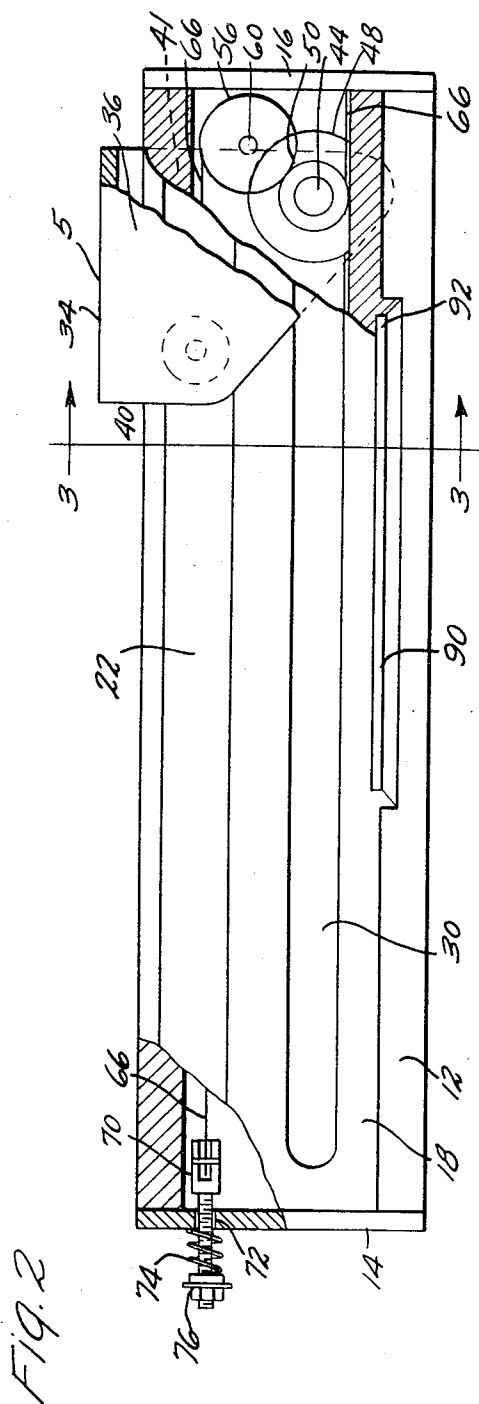
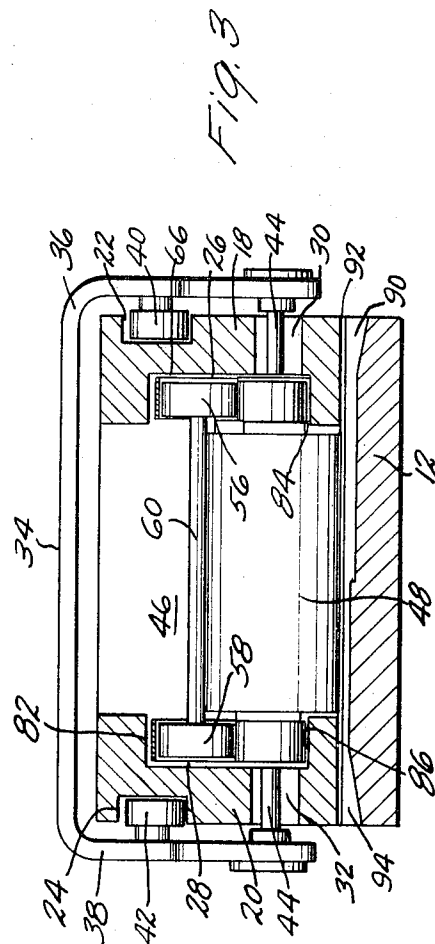


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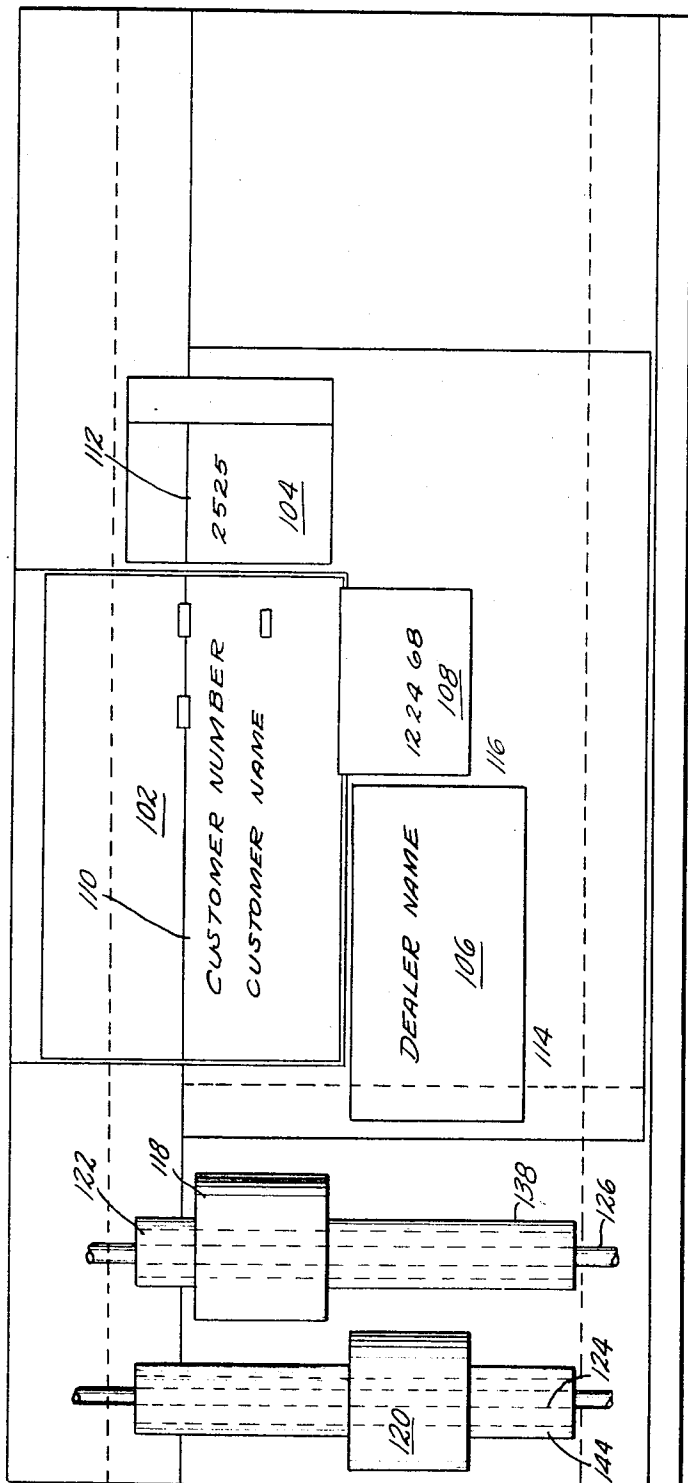


Fig. 6

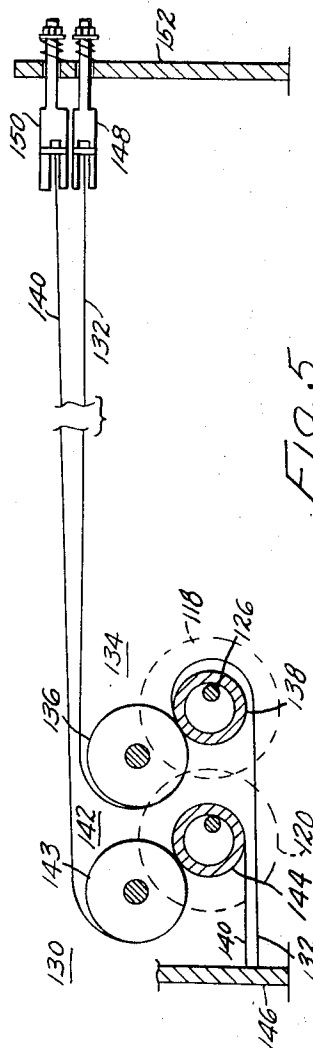


Fig. 5

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TRAVELING CYLINDER IMPRINTER INCLUDING FLEXIBLE BAND CYLINDER SUPPORT MEANS

RELATED APPLICATIONS

This application is a continuation-in-part of Ser. No. 789,854 filed Jan. 8, 1969, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to an improved imprinting apparatus and, in particular, to such apparatus for use with printing plates such as credit cards and the like.

An imprinting apparatus is disclosed in a corresponding application (now U.S. Pat. No. 3,565,007 granted Feb. 23, 1971) titled "Imprinting Apparatus" by Robert M. Tyburski and Stephen S. Wood, filed on the instant date herewith and assigned to the assignee of the present application. This imprinting apparatus utilizes a mechanical principle described in an article in Machine Design, Nov. 9, 1967, pages 44-48. The imprinter disclosed in the copending application is suitable for many applications and has many advantages, which are described in detail in that application. The imprinting apparatus of the present application may be employed in certain applications in addition to those described in the copending application.

In particular, the imprinting apparatus of the subject application incorporates the above-mentioned mechanical principle while at the same time permitting the insertion of printing plates such as credit cards and documents such as invoices through apertures in the sides of the imprinting apparatus rather than through the end of the apparatus.

Thus, it is a primary object of this invention to provide an improved imprinting apparatus incorporating the above-mentioned mechanical principle where a printing plate and document may be loaded or inserted through the side of the apparatus.

It is a further object of this invention to provide an improved imprinting apparatus incorporating the above mechanical principle where the bands necessary to effect this principle are disposed above the upper surface of the print bed of the apparatus to facilitate positioning of a printing plate and a document over the print bed.

It is a further object of this invention to provide an improved imprinting apparatus of the above type suitable for imprinting two separate print fields within the print bed area, the adjustment of the roller platen assemblies respectively associated with said print fields being independently adjustable.

It is a further object of this invention to provide an improved imprinting apparatus of the above type wherein any tendency of the roller platen to slip with respect to the printing medium (invoice, e.g.) is accommodated thereby minimizing smudging.

Other objects and advantages of this invention will become apparent upon reading the appended claims in conjunction with the following detailed description and the attached drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an isometric illustration of an illustrative embodiment of the invention.

FIG. 2 is a front elevation view of the FIG. 1 embodiment.

FIG. 3 is a cross-section taken on line 3-3 of FIG. 2.

FIGS. 4 and 5 are diagrammatic views illustrating the principle of operation of the invention.

FIG. 6 is a plan view of a further embodiment of the invention.

DETAILED DESCRIPTION OF AN ILLUSTRATIVE EMBODIMENT OF THE INVENTION

In FIG. 1, the imprinter is generally designated as 10, the imprinter being partially broken away to more clearly illustrate the invention. A base plate 12 is provided having up-standing side plates 14 and 16 secured thereto by appropriate

means not shown, plate 14 being partially broken away. Referring to FIGS. 1 and 3, front and rear plates 18 and 20 are shown, plate 18 being partially indicated in phantom lines in FIG. 1. As can best be seen in FIG. 3, side plates 18 and 20 are provided with a first pair of channels 22 and 24 and a second pair of channels 26 and 28. Further, these plates are respectively provided with a pair of elongated apertures 30 and 32 which respectively open into the bottom portions of channels 26 and 28, aperture 30 also being shown in FIG. 2. Both of the above channel pairs extend along the length of the plates 18 and 20, and, in particular, at least along the print bed portion of the base 12.

An imprinter roller assembly carriage or handle 34 includes downwardly extending sidearms 36 and 38, see FIG. 2. Rotatably connected to the inside of sidearm 36 are rollers 40 and 41 (see FIG. 2) which respectively cooperate with and roll along the channel 22 whenever an imprinting operation is effected. Rotatably connected to the inside of sidearm 38 is another roller pair, one of which is shown at 42 in FIG. 3, and both of which cooperate with and roll along channel 24 whenever an imprinting operation is effected. Also connected to the sidearms 36 and 38 is shaft 44 which is utilized to propel the imprinter roller assembly 46 upon movement of the handle 34 across the print bed area of base 10, as will be brought out hereinafter.

The imprinter roller assembly is generally indicated at 46 in FIG. 1 and comprises the imprinter roller 48 mounted on a cylindrical sleeve 50 having integral hub portions 52 and 54 disposed at the respective ends thereof. The shaft 44 is loosely connected within the sleeve 50 as can best be seen in FIG. 4. Preferably, the diameter of shaft 44 is approximately one-half the internal diameter of the sleeve 50. Thus, whenever the shaft 44 is forced against the inner surface of sleeve 50, only horizontal motion is imparted thereto, rotational and vertical movement being permitted by means to be described hereinafter.

The imprinter roller assembly 46 also includes a pair of idler rollers 56 and 58, these rollers being connected together by idler shaft 60. The idler rollers 56 and 58 may in some instances preferably be ball bearing rollers. The hub portions 52 and 54 may be considered rollers for the purposes of this invention. Thus, the hub portion 52 of sleeve 50 together with the idler roller 56 forms a first roller cluster (generally indicated at 62) while the hub portion 54 together with idler roller 58 forms a second roller cluster generally indicated at 64. The rollers within the clusters 62 and 64 are held together by bands 66 and 68 respectively, band 68 being only partially shown in FIG. 1, the construction of this band and the connection of it to the imprinter assembly being exactly the same as the construction and connection of band 66. As can best be seen in FIG. 4, band 66 passes over and around idler roller 56 and then around and under hub portion 52 of sleeve 50. Referring to FIGS. 1 and 4, it can be seen that the band 66 is downwardly bent at one end thereof and fixedly connected to pin 68, which in turn is fixedly secured to side plate 16. The other end of band 66 is normally connected with respect to side plate 14 so as to permit horizontal movement thereof, this connection being most clearly shown in FIG. 2. The other end of band 66 is connected to an adjustment stud assembly 69 including stud 70, the stud in turn being connected through aperture 72 in side plate 14. A compression spring 74 is held between an adjustment nut 76 and the side plate 14, the nut 76 being threaded onto stud 70 to thereby provide the necessary adjustability. As stated above, the connection of band 68 is exactly the same as that for band 66 and thus, it has not been described although the adjustment stud for band 68 is generally indicated at 78 in FIG. 1.

The bands 66 and 68 are respectively constrained by (1) channel 26 and roller cluster 62, and (2) channel 28 and roller cluster 64. In particular, the bands 66 and 68 are constrained from above by tracks 80 and 82 respectively disposed at the tops of channels 26 and 28. Further, they are constrained from below by tracks 84 and 86 respectively disposed at the bot-

toms of channels 26 and 28. The pin 68 (see FIG. 1) is so disposed with respect to the bottom track 84 of channel 26 so as to insure that the track 84 does constrain the band 66 from below. Further, the adjustment stud assembly 69 of FIG. 1 is so disposed with respect to the upper track 82 of channel 26 so as to ensure that this track does indeed constrain the band 66 from above. Thus, it can be seen that the mechanical principle described in before-mentioned article is effectuated in this invention. In particular, two of the structures described in this article are respectively disposed at opposite ends of a roller platen.

The print bed area of the imprinter is generally indicated at 88, see FIGS. 1 and 3. Recess 90 is provided in base 12 for receiving a printing plate 92 indicated in phantom lines at FIG. 1. Further, plate 18 is slightly channeled at 93 so as to insure passage of the plate into the print bed area 88, as can best be seen in FIG. 2. Referring to FIG. 3, base 12 is provided with a second recess 94 at the opposite side thereof for receiving a document such as an invoice indicated in phantom lines at 96 in FIG. 1.

Preferably, roller 48 is loosely mounted on sleeve 50 (typical clearance between the roller and the sleeve on any particular radial being approximately 0.0075 inch) so as to accommodate any slippage which tends to occur when roller 48 is tightly mounted on sleeve 50. When tightly mounted, slippage tends to occur because the diameter of roller 48 is larger (typically twice as large) than that of sleeve 50, the rotational velocity of which is determined by bands 66 and 68. Thus, the tangential velocity of a point on the roller surface when contacting the printing medium (document such as an invoice, for example) is greater than the linear horizontal velocity of the sleeve 50 thereby tending to result in smudging. As stated above, when the roller is loosely mounted, this problem is minimized.

Reference should now be made to FIGS. 5 and 6 which illustrate a further embodiment of the invention, and, in particular, these figures illustrate how the basic principle disclosed in FIG. 1-4 may be extended to an imprinter application where more than one printing field is disposed within the print bed. Referring to FIG. 6, the print bed is generally indicated at 100 and comprises area 102 which contains customer identification data, area 104 which contains variable data such as the money amount of a sales transaction, area 106 which contains variable data such as the date of the transaction and area 108 which contains identification data relating to a dealer, merchant, or the like. Included at area 102 is the customer's name and identification number 110 which is usually embossed or etched on a printing plate such as a credit card or the like. Included at area 104 is an amount 112 which may correspond to a transaction amount of \$25.25. The data 110 and 112 comprises a first printing field within the print bed 100.

Included at area 106 is the dealer's name 114 and at area 108 the transaction date 116. This dealer and date information corresponds to a second printing field within the print bed 100. Respectively associated with the first and second printing fields are roller platens 118 and 120 which are diagrammatically illustrated in plan view in FIG. 6. The roller platen 118 causes the customer data 110 and the amount data 112 to be imprinted on a sales invoice or the like while roller platen 120 causes the dealer data 114 and the date data 116 to be imprinted on the same document. Thus, if the height of the characters in the first printing field is different from that of the characters in the second printing field (which is usually the case), the adjustment procedure is simplified since the characters within the first printing field may be adjusted to a level different from the level of the characters within the second printing field. Further, it is possible with the arrangement of FIG. 6 to effectuate the mechanical principles of the embodiment of FIGS. 1-4 into an imprinter which imprints both fixed and variable data, the fixed data originating from the customer's credit card and the dealer plate and the variable data from the money amount and date wheels. The fixed data is placed in

recesses similar to the recess 90 shown in FIG. 3. The variable data is supported by means well known within this art and the height thereof with respect to the print bed 100 (that is, the upper surface of base 12) can be adjusted in accordance with means disclosed in copending application Ser. No. 701,747 filed Jan. 30, 1968 by William P. Barbour and assigned to the assignee of the present application.

The rollers 118 and 120 are respectively disposed on sleeves 122 and 124, each of these sleeves corresponding to the sleeve 50 of the first embodiment of the invention. Loosely disposed within each of these sleeves are shafts 126 and 128, each of which correspond to the shaft 44 of the first embodiment of the invention. These shafts are shown broken off in FIG. 6 but are connected to the sidearms 36 and 38 of handle 34 in exactly the same manner as the connection of shaft 44.

Referring to FIG. 5, a diagrammatic side view of the imprinter roller assembly is generally indicated at 130, the roller platens 118 and 120 being shown in dotted lines. Band 132 is associated with a first roller cluster pair 134 comprising idler roller 136 and hub portion 138 of sleeve 122. Band 140 is associated with roller cluster pair 142 comprising idler roller 143 and hub portion 144 of sleeve 124. Both of the bands 132 and 140 are fixedly connected to side wall 146, each band being connected in a manner similar to that indicated at 68 in FIG. 1 for band 66. Further, the bands 132 and 140 are respectively connected to adjustment studs 148 and 150 through side wall 152 in the exact same manner as band 66 is connected to adjustment stud assembly 69 in FIG. 1. The band 132 is directly below the band 140 although they may be placed side by side if so desired. Of course, a corresponding pair of bands (not shown) would be disposed at the opposite side of the roller platens 118 and 120, the position of the further pair of bands corresponding to the position of band 68 of the first embodiment of the invention. There would, of course, be a further pair of roller clusters respectively associated with this further pair of bands. The details of these further bands and roller clusters are not shown since the construction and operation thereof are exactly the same as the bands 132 and 140 of FIG. 5. Further, other details have not been shown in the second embodiment of the invention illustrated in FIGS. 5 and 6 because these details are illustrated with respect to the embodiment of FIGS. 1-4. Thus, unnecessary duplication has been avoided when possible in order that the second embodiment might be more clearly illustrated and described.

It can now be seen that the imprinting apparatus of the present invention is such that the lower tracks 84 and 86 of FIG. 3 are disposed above the upper surface of the print bed 88. Hence, the bands 80 and 82 will not interfere with the insertion of the printing plates and documents into the print bed area. Further, any details of the present invention not disclosed in detail in this application are disclosed in the before-mentioned copending application filed herewith. Hence, the subject of that application is incorporated herein by reference.

Numerous modifications of the invention will become apparent to one of ordinary skill in the art upon reading the foregoing disclosure. During such a reading it will be evident that this invention provides a unique imprinting apparatus for accomplishing the objects and advantages herein stated.

What is claimed is:

1. Imprinting apparatus comprising
 - a print bed;
 - a roller platen;
 - a carriage having at least two rollers disposed at opposite sides thereof and cooperating with opposite sides of said printing apparatus for movement of said carriage over said print bed;
 - means connected between said carriage and said roller platen for moving said roller platen whenever said carriage is moved;
 - first and second channels respectively disposed at two sides of said printing apparatus, the bottoms of said first and second channels are disposed above the upper surface of said print bed;

first and second roller pairs respectively disposed and connected to opposite ends of said roller platen and respectively disposed within said first and second channels, one of said rollers of said first roller pair being connected to one of the rollers of said second roller pair and the other roller of said first roller pair being connected to the other roller of said second roller pair;

first and second flexible bands respectively disposed within said first and second channels, each band being connected at one end of said imprinting apparatus at the top of its associated channel and at the other end thereof at the bottom of its associated channel and each band passing from its connection at said one end of the imprinting apparatus over and around one of its associated roller pairs and then around and under the second roller of its associated roller pair and thence to said connection at the other end of said imprinting apparatus;

elongated apertures respectively extending along opposite sides of said imprinting apparatus for respectively receiving a printing plate and a document;

whereby said plate and said document may be respectively inserted through said apertures and positioned over said print bed preparatory to an imprinting operation.

2. Apparatus as in claim 1 where said elongated apertures are respectively disposed between said bottoms of the channels and the upper surface of said print bed whereby insertion of said printing plate and said document is facilitated.

3. Apparatus as in claim 2 including a first recess in said print bed for receiving said printing plate after it has been inserted through its associated elongated aperture.

4. Imprinting apparatus as in claim 1 where said roller platen is a sleeve and said means for moving said roller platen includes a shaft loosely disposed within said sleeve, said shaft engaging the inner surface of said sleeve whenever motion is imparted to said carriage.

5. Apparatus as in claim 1 where the said first and second bands are movably respectively connected at said one end of said imprinting apparatus whereby variations in thicknesses of documents, printing plates, and embossings may be compensated.

6. Imprinting apparatus as in claim 1 including a second roller platen;

means connected between said carriage and said second roller platen for moving said second roller platen whenever said carriage is moved;

third and fourth roller pairs respectively disposed and connected to opposite ends of said roller platen and respectively disposed within said first and second channels, one of said rollers of said third roller pair being connected to one of the rollers of said fourth roller pair and the other roller of said third roller pair being connected to the other roller of said fourth roller pair;

third and fourth flexible bands respectively disposed within said first and second channels and respectively associated with said third and fourth roller pairs, each band being connected at one end of said printing apparatus at the top of its associated channel and at the other end thereof at the bottom of its associated channel and each band passing from its connection at said one end of the imprinting apparatus over and around one roller of its associated roller pair and then around and under the other roller of its associated roller pair and thence to said connection at the other end of said printing apparatus;

whereby imprints are respectively created in a first print field associated with the first roller platen and in a second print field associated with the second roller platen, the coaction of said first roller platen with said first print field being substantially independent of the coaction of said second roller platen with said second print field.

7. Imprinting apparatus as in claim 6 where said second roller platen is a second sleeve and said means for moving said second roller platen includes a second shaft disposed within said second sleeve, and second shaft engaging the inner surface of said second sleeve whenever motion is imparted to said carriage.

8. Apparatus as in claim 6 including a first portion of said first print field, said first portion being recessed for receiving a first fixed data source and a second portion of said first print field including digit wheels comprising a first variable data source.

9. Apparatus as in claim 8 including a first portion of said second print field, said last-mentioned first portion being recessed for receiving a second fixed data source and a second portion of said second print field including second digit wheels comprising a second variable data source; and means for independently adjusting the height of said print fields with respect to one another.

10. Imprinting apparatus comprising a print bed;

a carriage having at least two rollers disposed at opposite sides thereof and cooperating with opposite sides of said imprinting apparatus for movement of said carriage over said print bed;

a roller platen;

means loosely connected between said carriage and said roller platen for moving said roller platen whenever said carriage is moved;

first and second channels respectively disposed at two sides of said printing apparatus;

first and second roller pairs respectively disposed at opposite ends of said roller platen and respectively disposed within said first and second channels, one of said rollers of said first roller pair being connected to one of the rollers of said second roller pair, the other roller of said first roller pair being connected to the other roller of said second roller pair, and both of said other rollers being connected to said opposite ends of said roller platen;

first and second flexible bands respectively disposed within said first and second channels, each band being connected at one end of said imprinting apparatus at the top of its associated channel and at the other end thereof at the bottom of its associated channel and each band passing from its connection at said one end of the imprinting apparatus over and around one roller of its associated roller pair and then around and under the other roller of its associated roller pair and thence to said connection at the other end of said imprinting apparatus;

a second roller platen;

means connected between said carriage and said second roller platen for moving said second roller platen whenever said carriage is moved;

third and fourth roller pairs respectively disposed and connected to opposite ends of said roller platen and respectively disposed within said first and second channels, one of said rollers of said third roller pair being connected to one of the rollers of said fourth roller pair and the other roller of said third roller pair being connected to the other roller of said fourth roller pair;

third and fourth flexible bands respectively disposed within said first and second channels and respectively associated with said third and fourth roller pairs, each band being connected at one end of said imprinting apparatus at the top of its associated channel and at the other end thereof at the bottom of its associated channel and each band passing from its connection at said one end of the imprinting apparatus over and around one roller of its associated roller pair and then around and under the other roller of its associated roller pair and thence to said connection at the other end of said imprinting apparatus;

whereby imprints are respectively created in a first print field associated with the first roller platen and in a second print field associated with the second roller platen, the coaction of said first roller platen with said first print field being substantially independent of the coaction of said second roller platen with said second print field.

11. Imprinting apparatus as in claim 10 where said second roller platen is a second sleeve and said means for moving said second roller platen includes a second shaft disposed within said second sleeve, and second shaft engaging the inner sur-

face of said second sleeve whenever motion is imparted to said carriage.

12. Apparatus as in claim 10 including a first portion of said first print field, said first portion being recessed for receiving a first fixed data source and a second portion of said first print field including digit wheels comprising a first variable data source.

13. Apparatus as in claim 12 including a first portion of said second print field, said last-mentioned first portion being recessed for receiving a second fixed data source and a second portion of said second print field including second digit wheels comprising a second variable data source; and means for independently adjusting the height of said print fields with respect to one another.

14. Imprinting apparatus comprising a print bed;

a carriage having at least two rollers disposed at opposite sides thereof and cooperating with opposite sides of said imprinting apparatus for movement of said carriage over said print bed;

a cylindrical roller platen having an aperture extending axially therethrough;

first connecting means connected between said opposite sides of said carriage for moving said roller platen whenever said carriage is moved;

first and second channels respectively disposed at two sides of said printing apparatus;

first and second roller pairs respectively disposed at opposite ends of said roller platen and respectively disposed within said first and second channels, second connecting means for connecting one of said rollers of said first roller pair to one of the rollers of said second roller pair, third

connecting means for connecting the other roller of said first roller pair to the other roller of said second roller pair, and said roller platen being mounted with clearance on said third connecting means, said third connecting means having an aperture extending axially therethrough, said first connecting means being axially disposed with clearance in the aperture of said third connecting means;

first and second flexible bands respectively disposed within said first and second channels, each band being connected at one end of said imprinting apparatus at the top of its associated channel and at the other end thereof at the bottom of its associated channel and each band passing from its connection at said one end of the imprinting apparatus over and around one roller of its associated roller pair and then around and under the other roller of its associated roller pair and thence to said connection at the other end of said imprinting apparatus

whereby an imprint is created whenever said roller platen is moved across said print bed.

15. Imprinting apparatus as in claim 14 where said third connecting means comprises a sleeve and said other rollers comprise respective integral end portions of said sleeve and said first connecting means for moving said roller platen comprises a shaft disposed in said sleeve.

16. Imprinting apparatus as in claim 15 where the diameter of said shaft is approximately one-half the internal diameter of said sleeve.

17. Imprinting apparatus as in claim 16 where the clearance between said roller platen and said sleeve is approximately 0.0075 inch.

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