United States Patent

[11] 3,596,596

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[54] **GUIDE MEANS FOR TRAVELING ROLLER IN PORTABLE IMPRINTERS**
9 Claims, 14 Drawing Figs.

[52] U.S. Cl. **101/269**
[51] Int. Cl. **B41f 3/20, B41f 3/56**
[50] Field of Search 101/269, 274, 55, 56, 250

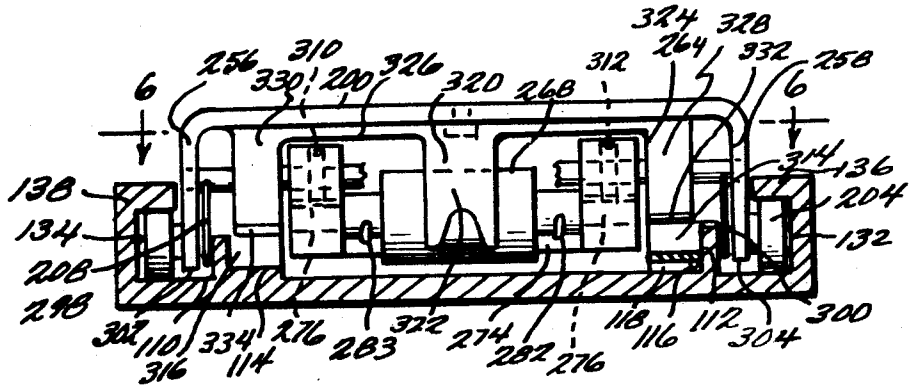
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ABSTRACT: A portable imprinter is disclosed, the construction thereof being particularly compact. The imprinting head moves along a pair of tracks disposed at opposite sides of the print bed, the head being guided along the tracks by wheels and guide members disposed on the opposite sides of the bottom thereof to respectively minimize vertical motion of the head with respect to the print bed and rotational motion with respect to an imaginary vertical axis passing through the head. The printing plates are placed directly on the bed and appropriate means are provided for securing them to the bed. Means are also provided for securing the document over the print bed, these means becoming operative after the imprinting head has left its rest position. Also provided are means disposed within the imprinting head for adjusting the initial clearance between the roller platen and the print bed, these means being operative to move the roller platen shaft downwardly against the upwardly acting force exerted by a spring disposed within the head. Means are also disclosed for raising the roller platen upwardly from the print bed after an imprinting operation, the roller platen being lowered to its print position immediately upon its return to the rest position of the head. Means attached to the imprinting head and projecting from the front thereof are also provided for holding the document in place during the imprinting operation.



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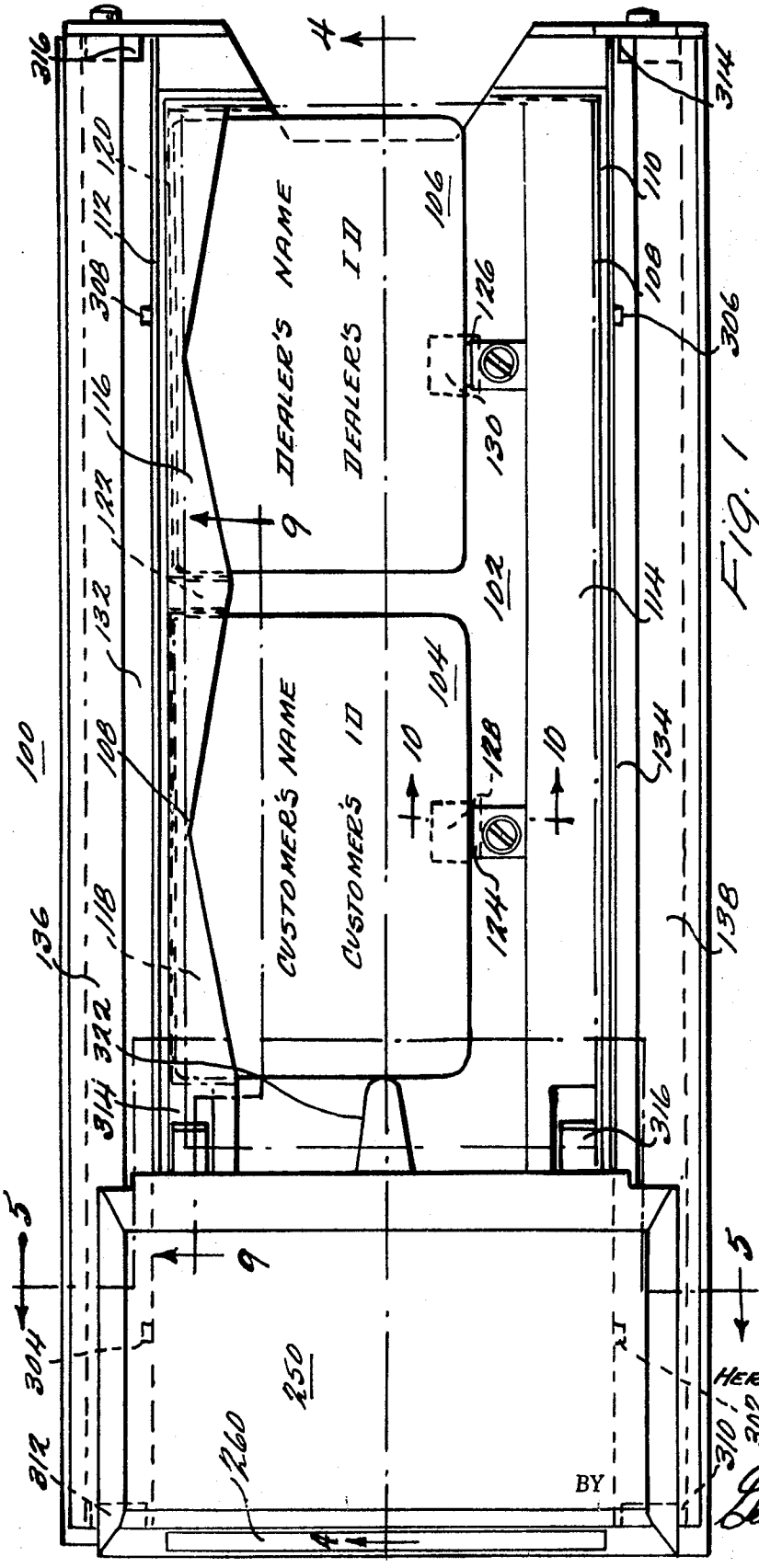


Fig. 1

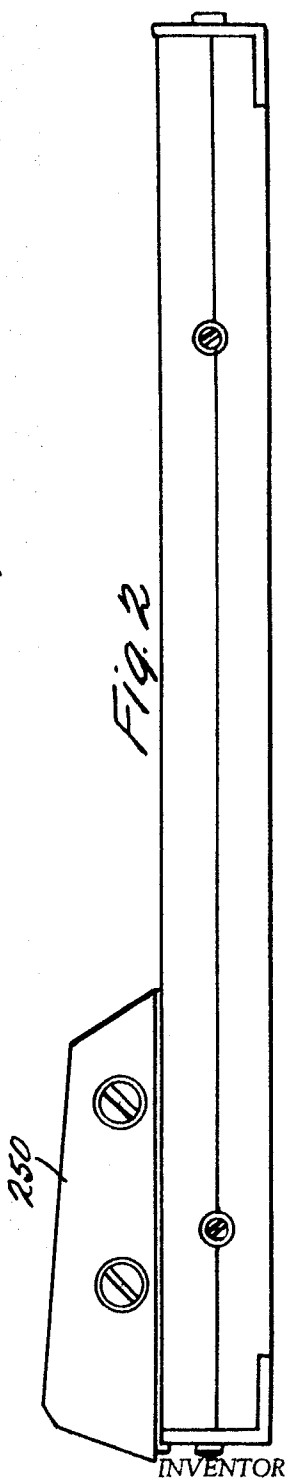


Fig. 2

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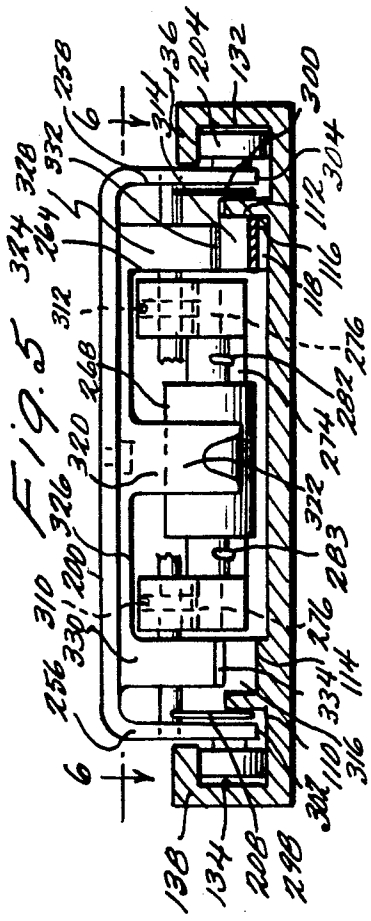


Fig. 5

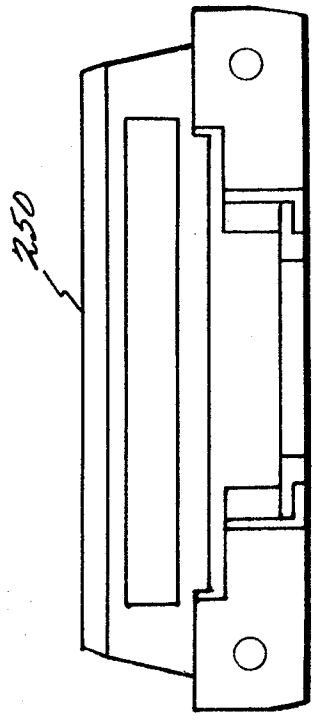


Fig. 3

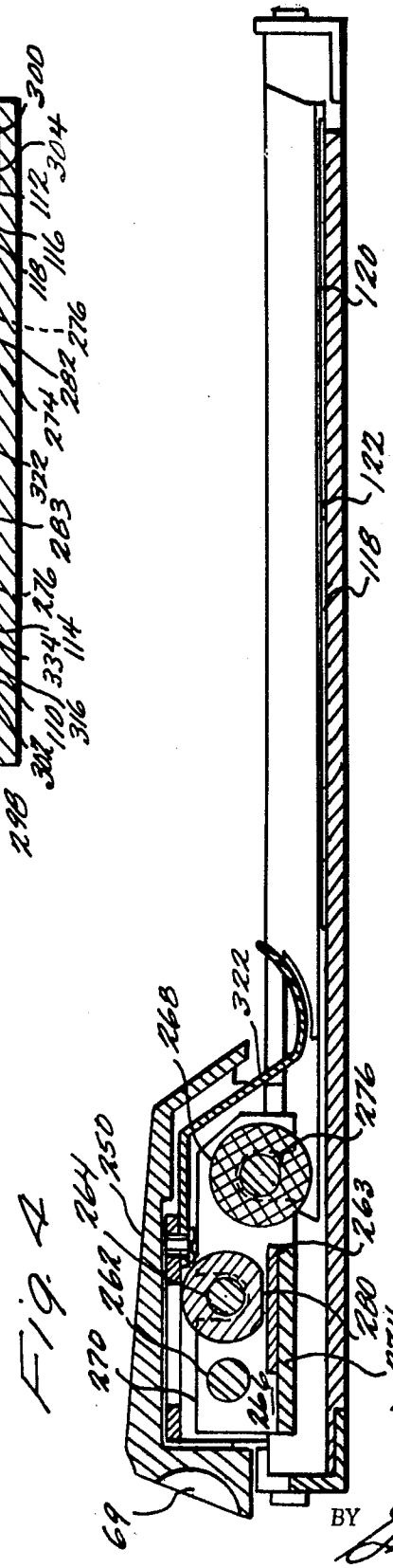


Fig. 4

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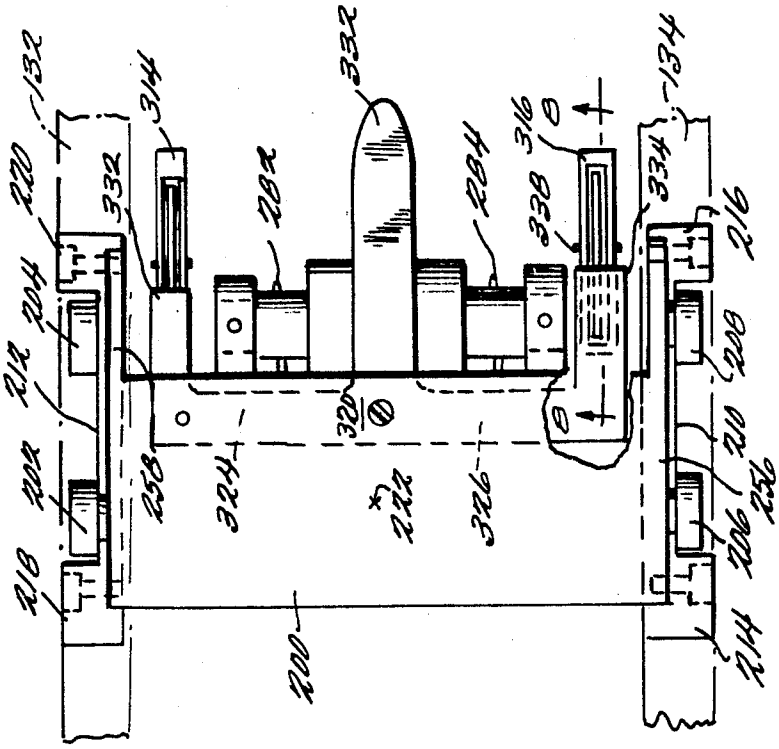


Fig. 7

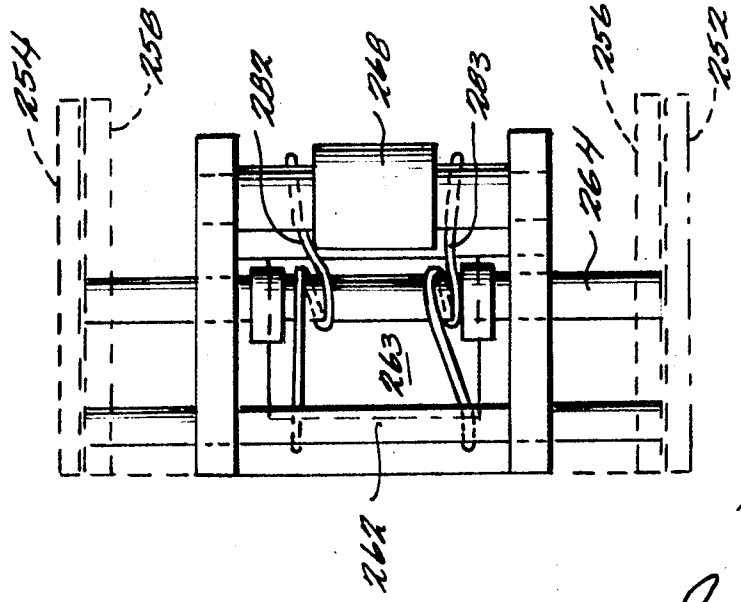


Fig. 6

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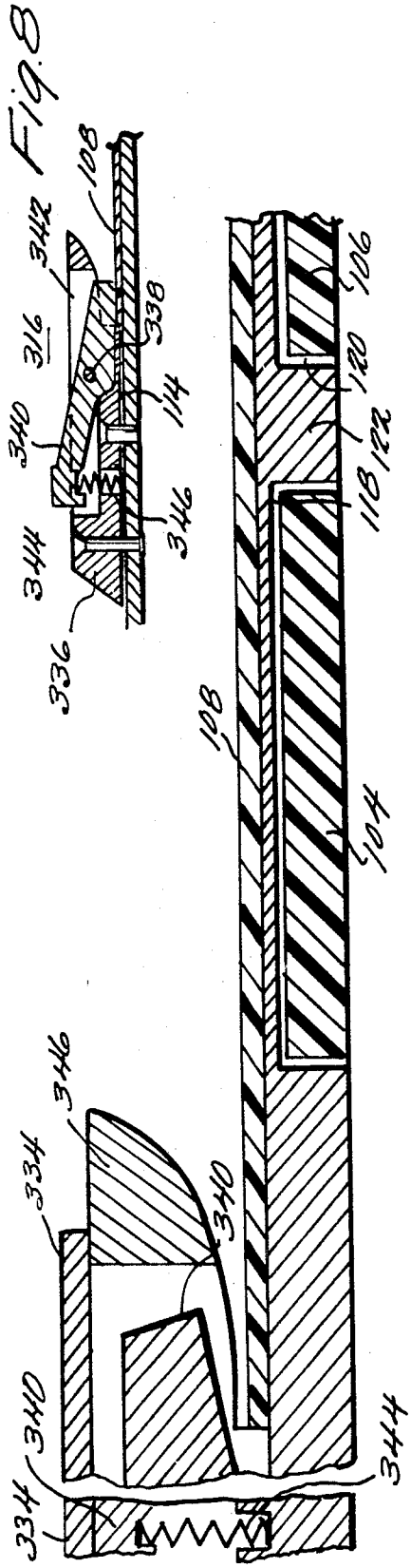


Fig. 8

Fig. 9

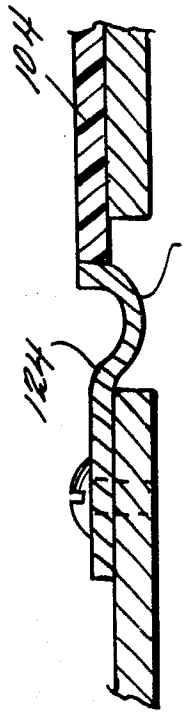
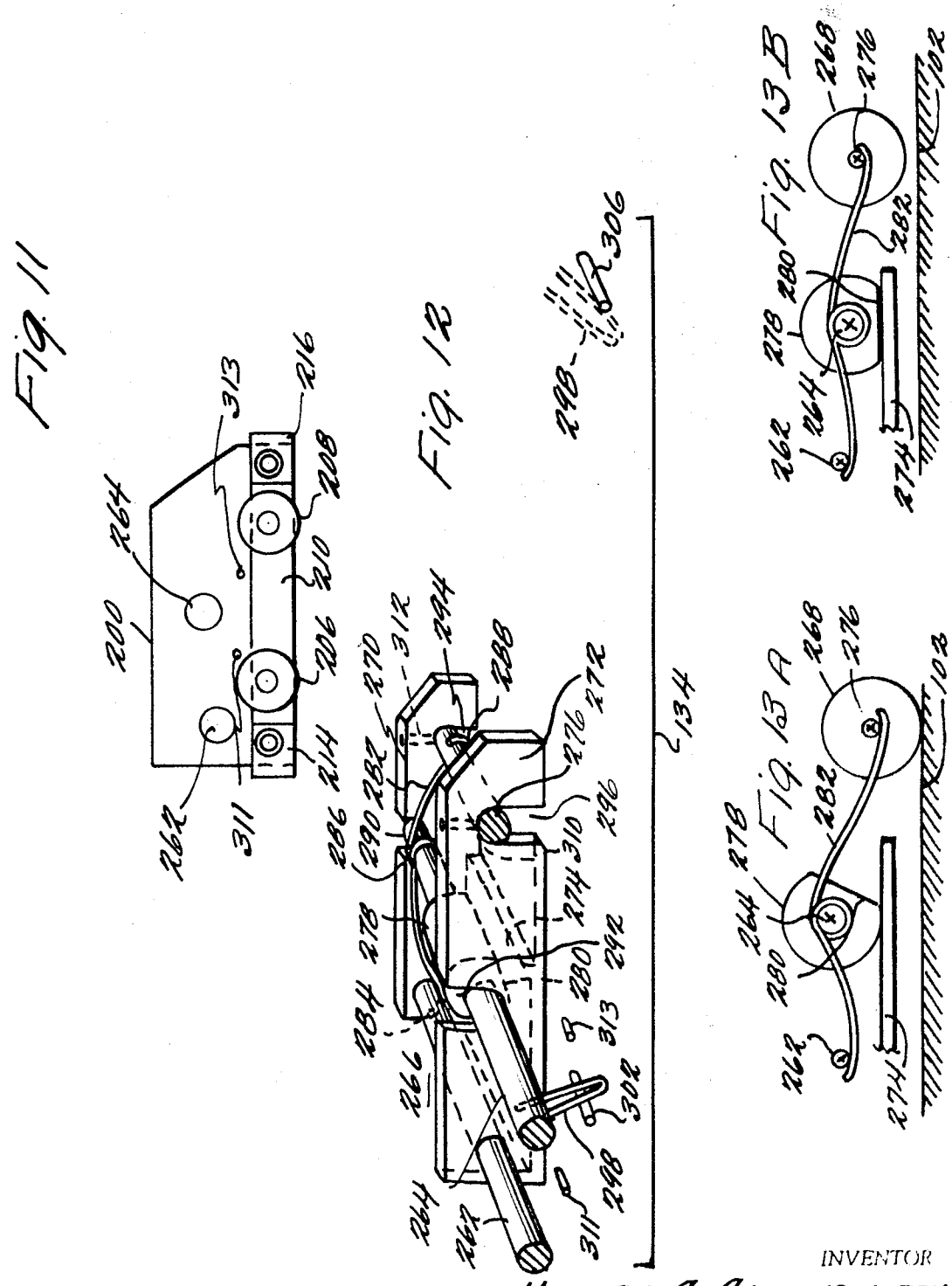


Fig. 10

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Fig. 11
Fig. 12
Fig. 13A
Fig. 13B
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GUIDE MEANS FOR TRAVELING ROLLER IN PORTABLE IMPRINTERS

BACKGROUND OF THE INVENTION

This invention relates to imprinters for use with credit cards and the like, and, in particular, to portable imprinters of the above type.

Although the imprinting art is well established with the use of credit cards and the like being widespread, the need for an adequate portable imprinter has not yet been met. This need has arisen in many situations such as airlines, for example, where the imprinter operator such as an airline hostess goes from customer to customer rather than the customer coming to the sales person. Further, where a deliveryman or the likes goes from one house to another is illustrative of another of the many instances where the imprinter must be taken to the person being dealt with. By its very nature, a portable imprinter must necessarily be light, compact, easily carried, while at the same time being able to effectuate high quality imprints since the imprinted document such as a sales ticket will in many instances, be eventually read by optical character readers which require a high quality of print to insure optimum operation thereof.

SUMMARY OF THE INVENTION

Thus, it is a primary purpose of this invention to provide an improved portable imprinter.

It is a further object of this invention to provide such an imprinter including means for adjusting the clearance of the roller platen with respect to the print bed by means disposed within the imprinting head.

It is a further object of this invention to provide such an imprinter including means for raising the roller platen with respect to the print bed so that the roller platen will be elevated during the return stroke, the roller platen being lowered to its print position immediately upon its return to the rest position for the imprinting head.

It is a further object of this invention to provide such an imprinter whereby the printing plate such as a credit card is placed directly onto the print bed rather than an anvil.

It is a further object of this invention to provide an imprinter of the above type including means for securing the document over the print bed, these means becoming operative immediately after the imprinting head is moved from its rest position.

It is a further object of this invention to provide an imprinter of the above type including a means projecting from the imprinting head for maintaining the document in place as the imprinting operation progresses.

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

FIGS. 1, 2 and 3 are respectively plan, elevation, and end views of an illustrative embodiment of the portable imprinter of this invention.

FIGS. 4 and 5 are cross-sectional views taken on the lines 4–4 and 5–5 respectively of FIG. 1.

FIG. 6 is a cross-sectional view taken on the line 6–6 of FIG. 5.

FIG. 7 is a top view of an illustrative embodiment of the imprinting head of this invention.

FIG. 8 is a cross-sectional view of an illustrative embodiment taken along the line 8–8 of FIG. 7 of the document securing means of this invention.

FIGS. 9 and 10 are cross-sectional views taken on lines 9–9 and 10–10 respectively of FIG. 1.

FIG. 11 is a side view of the imprinting head in FIG. 7.

FIG. 12 is an isometric illustration of a typical yoke in accordance with this invention.

FIGS. 13A and 13B are diagrammatic illustrations showing one aspect of the operation of this invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring to the figures of the drawing there is shown an imprinter generally indicated at 100 in FIG. 1 comprising a print bed, the print bed indicated at 102 having disposed therein two credit cards 104 and 106 respectively providing customer and dealer information to be printed on a document such as a sales slip, the document being generally indicated in dashed lines at 108. As can best be seen in FIGS. 1 and 5 a pair of upstanding members 110 and 112 are provided to restrict the area in which the sales document can be placed, this area being more than adequate for most applications. In FIG. 5 it can be seen that raised portions 114 and 116 are respectively connected to members 110 and 112, these raised portions rising above print bed 102.

As can be seen in FIG. 1, the raised portion 116 is shaped differently from that of portion 114, portion 116 including hollow portions 118 and 120 as can be seen in FIGS. 4, 5 and 9. Further, in some instances it is preferable to make portion 116 from a plastic material having properties similar to plexiglass although a material such as aluminum may also be used. These hollow portions assist in securing cards 104 and 106 in place during an imprinting operation. Generally indicated at 122 in FIGS. 1 and 9 is structure for insuring that there is minimal movement of the cards in the direction of travel of the imprinting head during the imprinting operation, this structure not being described in detail. The cards 104 and 106 are further removably secured to the bed 102 by spring clips 124 and 126. Clip 124 is shown in detail in FIG. 10 securing the card 104. As can be seen openings 128 and 130 respectively permit the springs 124 and 126 to retract therein whenever cards 104 and 106 are not disposed within the print bed.

Referring to FIGS. 1 and 5 it can be seen that tracks 132 and 134 are provided for movement of the imprinting head generally indicated at 245 along the print bed. In FIG. 5 it can be seen that the tracks 132 and 134 are respectively substantially enclosed on the top thereof by extensions 136 and 138, both of which are disposed along the entire length of the imprinter. The imprinting head 245 includes a housing 200 having vertically disposed sidewalls 256 and 258 upon which are mounted four wheels or bearings 202—208 as can be seen in FIG. 7. In FIG. 5 are shown wheels 204 and 208 and, as can be seen, the extensions 136 and 138 minimize movement of these wheels together with the head in the vertical direction because the diameter of the wheels is only slightly less than the distance between the top and bottom surfaces of the enclosed portions of the track.

Means for minimizing rotational movement of the head through an imaginary axis extending vertically through the head and indicated at 222 in FIG. 7 is minimized by appropriate means. As can be seen in FIG. 11, there is provided at the lower portion of housing 200 a guide member 210, another such guide member 212 being provided at the opposite side of the housing 200. These guides are preferably made from a material such as nylon. The guides 210 and 212 are respectively provided with outwardly extending projections 214, 216, and 218, 220, as can be seen in FIG. 7. Further, shown in dashed lines are the tracks 132 and 134. It can be seen that any tendency for the head to rotate about the imaginary vertical axis 222 is minimized because the horizontal dimension of the tracks is only slightly greater than that of the guides 210 and 212. Further, these guide members keep the surfaces of tracks clean since they slide along these surfaces during an imprinting operation. Hence, the combined action of the guides 210 and 212 and the bearings 202—208 on the partially enclosed tracks 132 and 134 causes the imprinting head 245 to follow the smoothest possible path during the imprinting operation in spite of the uneven characteristics usually found in credit cards after substantial use thereof.

A handle 250 is shown in FIGS. 1—3, this handle being snugly fitted over the head 245 as is indicated in FIG. 4. In particular, the inner sides of the handle 250 are substantially flush with the outer sides of the housing 200, this being indicated in FIG. 6 where the sides 252 and 254 (indicated by dashed lines) of handle 250 are disposed immediately adjacent the sides 256 and 258 (shown in dotted lines) of the housing 200. As can be seen in FIG. 4 the handle 250 includes a grooved portion 260 which permits the operator to insert her fingers therein and move the head across the print bed 102.

Referring to FIGS. 4, 5, 6, 11, and 12, the structure necessary to effectuate an imprint is shown. Disposed between the side legs 256 and 258 of housing 200 are shafts 262 and 264, the handle sides 252 and 254 maintaining these shafts in the position shown in FIG. 6 because of the flush mounting of the handle 250 over the head 200, as stated hereinbefore.

As can best be seen in FIG. 12, a yoke generally indicated at 266 is rotatably mounted about shaft 262, the yoke being rotatably mounted so as to allow the roller platen 268 to be raised from the print bed surface during the return stroke of the imprinting head to the rest position shown in FIG. 1. The roller platen 268 is not shown in FIG. 12 for the purpose of illustrating more clearly the operation of the imprinter; however, the shaft 276 upon which the roller platen is mounted is shown. Yoke 268 has two side legs 270 and 272, these side legs being connected together at the bottom thereof by plate 274. Mounted upon the shaft 264 is a sleeve 278 having a cammed surface 280, the cammed surface corresponding to a straight-edged truncation of one side of the sleeve 278. Although shown as a solid sleeve in FIG. 12, it is to be understood that this sleeve may be so formed as to provide a circularly grooved portion about the middle thereof leaving the cammed surfaces at the ends of the sleeve. A wire spring 282 is connected underneath the shaft 262 at 284, wound about the shaft 264 at 286 and connected underneath the shaft 276 at 288. Although not shown in FIG. 12, another spring 283 is disposed at the other side of sleeve 278, as can be seen in FIG. 6, spring 283 performing the same function as spring 282. The side legs 270 and 272 are provided with further U-shaped cuts 290 and 292 for receiving the shaft 264. Further, the side legs 270 and 272 are provided with further U-shaped cuts 294 and 296 for receiving the roller platen shaft 276. Shaft 262 is fixedly mounted with respect to the housing 200 which in turn is capable of only translational motion with respect to the print bed 102. Thus, the action of springs 282 and 283 is effective to hold the shaft 264 downwardly within cuts 280 and 282 and shaft 276 upwardly within cuts 294 and 296.

Disposed at the ends of shaft 264 are fingers 298 and 300 as can be seen in FIG. 5. However, only finger 298 is shown in FIG. 12 for purposes of illustration. Also disposed on the outer sides of the extensions 110 and 112 of FIG. 1 are posts 302—308. In FIG. 12 only the posts 302 and 306 are shown in relation to the track 134. Shaft 264 is rotatably mounted with respect to housing 200 and thus, when the head is in the rest position shown in FIG. 12, the finger 298 is rotated in the direction shown at the left of FIG. 12 while after the head has traversed the printing bed, the finger 298 is rotated to the position shown at the right of FIG. 12, the finger at this time engaging post 306. The finger 298 always remains on the inside of the posts 302 and 306 as indicated in FIG. 12. That is, the fingers 298 and 300 are prevented from moving to the outer side of posts 302 and 308 because of stops 310—316 disposed at the ends of the tracks 132 and 134 as can be seen in FIG. 1. These stops are so positioned as to prevent the head from further movement and thereby insure that the fingers 298 and 300 remain inside the posts 302—308, as indicated in FIG. 12. Also pins 311 and 313 are disposed on the inner side of side leg 256 of housing 200, to prevent the finger 298 from rotating completely about the shaft 264 upon the moment of impact with the posts 302 and 306. The pins 311 and 313 are diagrammatically indicated in FIG. 12. Similar pins are disposed on side leg 258 of housing 200 but not shown.

When the finger 298 is positioned as indicated at the left of FIG. 12, the cammed sleeve is positioned with respect to the plate 274 of yoke 266 as shown in FIG. 13A where the cross-marks indicate the locations of shafts 262, 264 and 276. When in this position, the roller platen 268 is lowered toward the print bed 102 because the yoke 266 is rotated about shaft 267. The platen is lowered against the force of spring 282 as a result of the action of the cammed surface 280 against the upper surface of plate 274 of yoke 266, the cammed surface having been rotated as the finger 298 was rotated.

Normally spring 282 biases yoke 266 against the underside of housing 200 as is indicated in FIG. 5. This is the situation which exists when the finger 298 is in the position shown to the right of FIG. 12. When so positioned, the cammed portion 280 of sleeve 278 will be flush against the upper surface of plate 270 as can be seen in FIG. 13B. However, when the imprinting head 200 is returned to its initial position the finger 298 will be rotated to the position indicated at the left of FIG. 12 by post 302 to thereby cause the sleeve 278 to rotate to the position shown in FIG. 13A and thereby lower the plate 274 of yoke 266 and thus position the roller platen 268 as shown with respect to print bed 102. The cammed sleeve is preferably made from casehardened cobalt steel. A brass plate indicated at 263 in FIG. 6 (but not shown in FIG. 12) is preferably mounted on plate 274 in order to provide a bearing surface for the cammed sleeve thereby increasing the working life thereof.

In summary, the action is one where when the head is in its rest position, the roller platen is lowered preparatory to an imprinting operation, this lowering occurring immediately upon the return of the head to the rest position—that is, as soon as finger 298 is rotated to the position indicated at FIG. 13A. This operation contrasts with respect to most imprinters in that the lowering operation usually occurs not at the time the head is returned to its rest position, but rather immediately prior to the next imprinting operation as the head is being moved away from its rest position and toward the print bed. Because of the technique employed to lower the head in this invention, the resulting structure is significantly simplified and thus rendered most appropriate for a portable imprinter.

Another feature of the invention which lends itself to portable imprinters is the fact that the initial clearance between the roller platen and the print bed is established by means solely disposed within the imprinting head. This is contrary to the usual way this is done whereby shims are provided to adjust the height of an anvil which supports this printing plate. There is no anvil in the portable imprinter of this invention. Rather, as has been described hereinbefore, the printing plates 104 and 106 are placed directly on the print bed 102. In order to more fully understand the technique employed in this invention to adjust the position of the roller platen 268 with respect to the bed, reference should be made to FIGS. 5 and 12. As can be seen in FIG. 12 appropriate means such as Allen screws 310 and 312 are disposed inside side legs 270 and 272 of yoke 266, these screws projecting through an opening which extends through the legs to the top of shaft 276 as also indicated in FIG. 5. These screws may be employed to lower the shaft 276 against the action of the springs 282 and 283 which tend to maintain the shaft in the uppermost possible position within the cuts 294 and 296. Hence, it can be seen that the adjustment for establishing the initial clearance of the roller platen 268 with respect to the print bed 102 is indeed quite simple and compatible with the requirements of a portable imprinter.

Another feature of the invention is the means provided for releasably securing the document 108 over the print bed 102. Referring to FIGS. 6, 8, and 9 there are shown two document securing means 314 and 316. As is indicated in FIGS. 5 and 7, a member generally indicated at 320 which coacts with document-securing means 314 and 316 and which is fixedly mounted onto housing 200 has a downwardly projecting finger 322 for keeping the document in place as the head traverses the print bed during the imprinting operation. The lowest point of the finger 322 should be so positioned above the bed

102 so as to minimize any tendency of the document to raise from the print bed as an imprinting operation occurs; however, this lower point should not be so low as to engage the document whenever the document is lying smoothly on the print bed. Further member 320 includes two horizontally connecting members 324 and 326, which are connected to downwardly extending portions 328 and 330 respectively. The portions 328 and 330 include horizontally extending fingers 332 and 334 respectively, these fingers being respectively disposed immediately above the document-securing means 314 and 316 when the head is in its rest position as can best be seen in FIG. 5. Briefly, fingers 332 and 334 actuate the document-securing means 314 and 316 when the head is in its rest position so as to permit the edge of the document to be inserted into the document-securing means. When the head is moved away from its rest position to effectuate an imprinting operation, the fingers 332 and 334 will be moved away from the document-securing means 314 and 316 thereby permitting means 314 and 316 to secure the inserted document at the edge thereof so as to prevent longitudinal movement thereof during the imprinting operation.

Referring to FIGS. 6 and 8 there is shown in detail document-securing means 316. A stationary member 336 is secured to raised portion 114 as indicated in FIG. 5. Pivoted around shaft 338 is a document clasping member 340, shaft 338 passing through the sides of member 336 and a hollow aperture portion 342. The clasping member 340 is disposed within hollow aperture portion 342. The hollow aperture portion 342 opens at at the bottom of the stationary member 336 to permit the clasping member to engage the document 108, this being illustrated in FIG. 8 which shows the document-securing means after the imprinting head has left its start position. A spring 344 engaging one end of the clasping member 340 rotates the member 340 about the shaft 338 thereby effectuating the document clasping and securing operation. The lower end of spring 344 is disposed against the raised portion 114 through aperture 346 in stationary member 336. Reference should be made to FIG. 9 for an illustration of how the spring 344 is depressed under the action of finger 334 to thereby raise the clasping member 340 away from the bottom opening in stationary member 336 to thereby establish a clearance for the insertion of document 108 preparatory to an imprinting operation.

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 portable imprinter for accomplishing the objects and advantages herein stated.

I claim:

1. A portable imprinter comprising:

a base member having a print bed disposed on the top thereof and tracks extending along opposite sides thereof, said tracks having inner surfaces and being substantially enclosed at the top and bottom along the length thereof;

an imprinting head disposed over said print bed for movement thereover to effect imprinting, said imprinting head including a roller platen and at least a pair of guide means having respective outer surfaces disposed at each side thereof, each said pair of guide means being respectively disposed in said tracks, the distance across said print bed between the inner surfaces of said tracks being related to the distance across said print bed between the outer surfaces of said guide means so as to minimize rotational movement of said head about an imaginary vertical axis extending therethrough approximately at the center thereof;

a pair of wheels disposed at said each side of said imprinting head, each said pair of wheels also respectively disposed in said tracks to permit movement of said head along said tracks and the diameter of each of said wheels being slightly less than the distance between the top and bottom of said tracks to thereby minimize vertical movement of said head with respect to said print bed;

said portable imprinter effecting an imprinting of data from printing plates placed on said print bed to documents placed over said print bed whenever said imprinting head is moved over said print bed.

2. Apparatus as in claim 1 where said imprinting head includes means for establishing the initial clearance of the roller platen of said imprinting head with respect to said print bed.

3. Apparatus as in claim 2 including means disposed on said print bed for securing the edge of said document to said print bed during the imprinting operation.

4. Apparatus as in claim 3 where said base member includes a rest position disposed approximately at one end thereof for said imprinting head and where said imprinting head includes means acting upon said document-securing means when the head is moved to its rest position to thereby permit a document to be inserted into said document-securing means preparatory to the next imprinting operation.

5. Apparatus as in claim 4 where said document-securing means includes means for securing the edge of said document to said print bed immediately after said head is moved from its rest position to effectuate an imprinting operation.

6. Apparatus as in claim 3 including means projecting from the front of said imprinting head for keeping the surface of said document adjacent said print bed as said imprinting operation occurs.

7. Apparatus as in claim 1 where said imprinting head includes at least one actuating finger rotatably connected thereto and where the roller platen is rotatably mounted with respect to said imprinting head and connected to said actuating finger and where said base includes posts projecting into said tracks and disposed at opposite ends thereof, said actuating fingers effectuating the rotation of said roller platen in response to the engagement of said actuating fingers by said posts;

said apparatus including means for raising said roller platen from said print bed when the imprinting head reaches the end of its imprinting stroke and

said apparatus including means for lowering said roller assembly to its print position immediately upon the return of said imprinting head to its rest position.

8. Apparatus as in claim 2 where said printing plates are disposed directly on said print bed, said bed including means for securing said plates to said bed.

9. Apparatus as in claim 1 where said distance between the inner surfaces of said tracks is slightly greater than the said distance between the outer surface of said guide means.