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3,232,230 2/1966 Sheldon..... 101/269
3,272,120 9/1966 Johnson 101/56
3,388,660 6/1968 Wight..... 101/269
3,410,207 11/1968 Barbour 101/269
3,417,691 12/1968 Kubovy 101/269
3,446,144 5/1969 Frampton et al. 101/269

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[54] LATCH MEANS FOR A TRAVELING ROLLER
PLATEN ON A SWINGABLE CARRIAGE
10 Claims, 11 Drawing Figs.

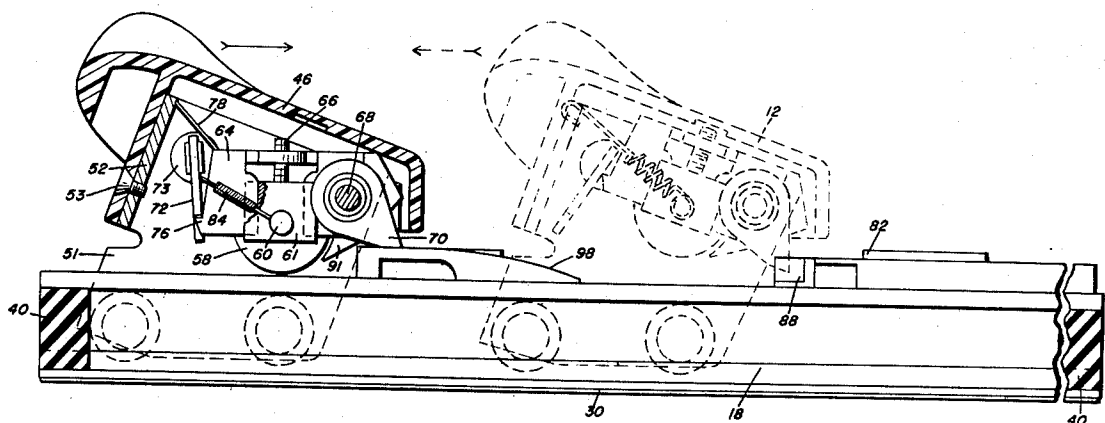
[52] U.S. Cl. 101/269,
101/56
[51] Int. Cl. B41f 3/20
[50] Field of Search..... 101/267,
282, 283, 284, 285, 274, 56

[56] References Cited

UNITED STATES PATENTS

3,018,725 1/1962 Maul et al. 101/269
3,260,199 7/1966 Huntley et al. 101/283X

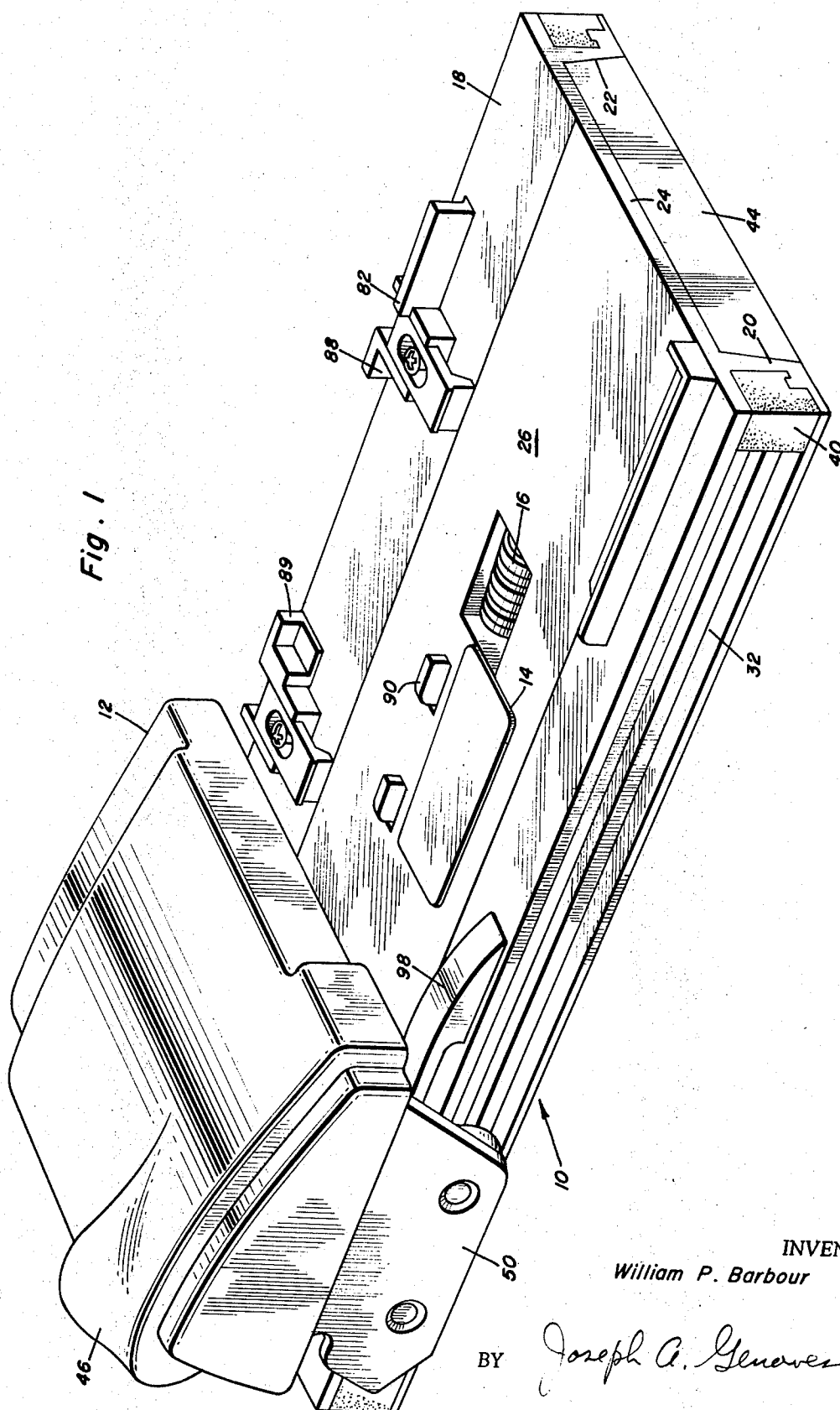
ABSTRACT: A rolling platen imprinter for portable printing plates, employing a positive action latch to hold the platen lowered to a precise distance above the imprinter bed plate during the imprint stroke and enabling the roller platen to be elevated a considerable distance above the bed plate during the non-printing return stroke. The load bearing and load distributing geometry existing between the imprinter base and platen-supporting carriage contribute to ease of operation, high quality imprints and importantly, to preserving that ease of operation and high print quality over long sustained use of the imprinter.



Patented Nov. 10, 1970

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Sheet 1 of 4



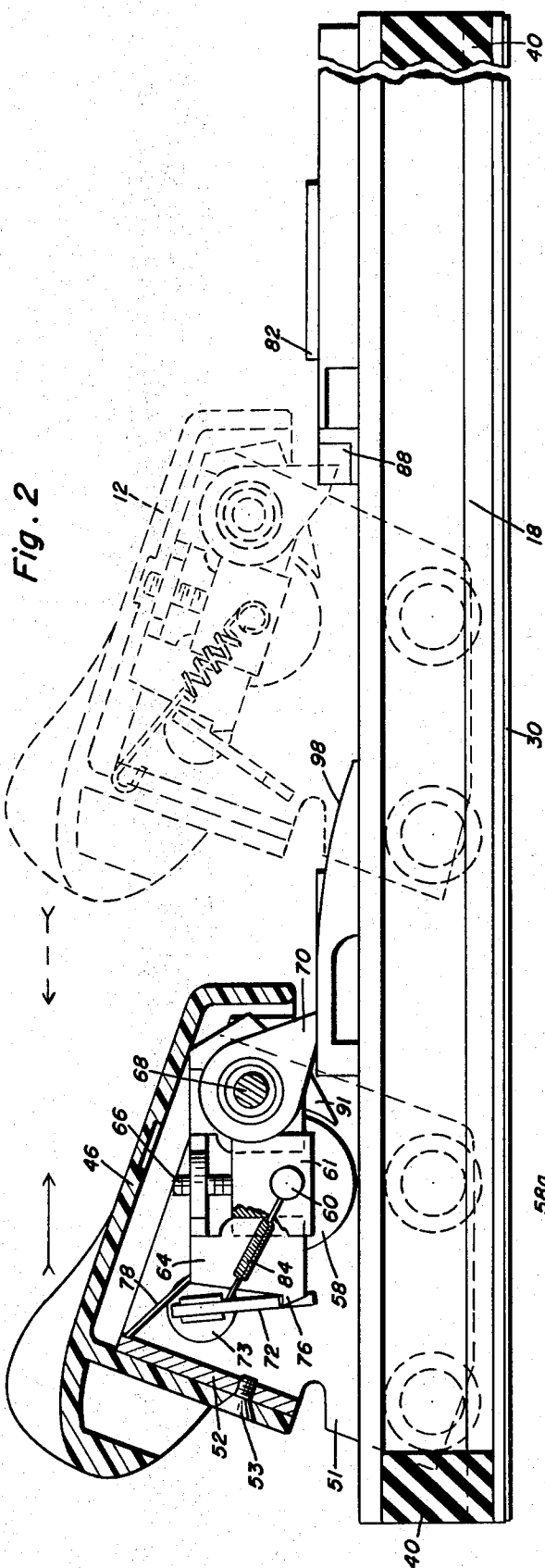
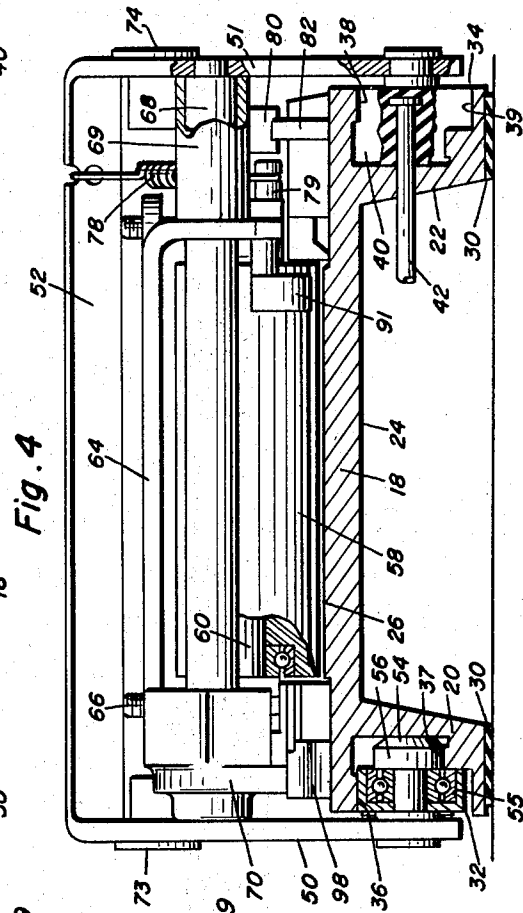
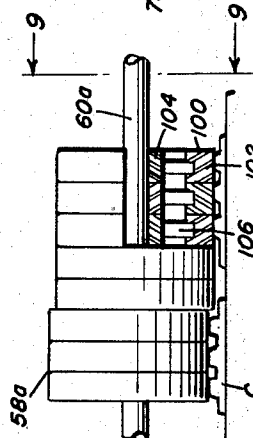
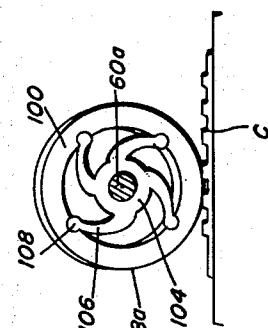
INVENTOR

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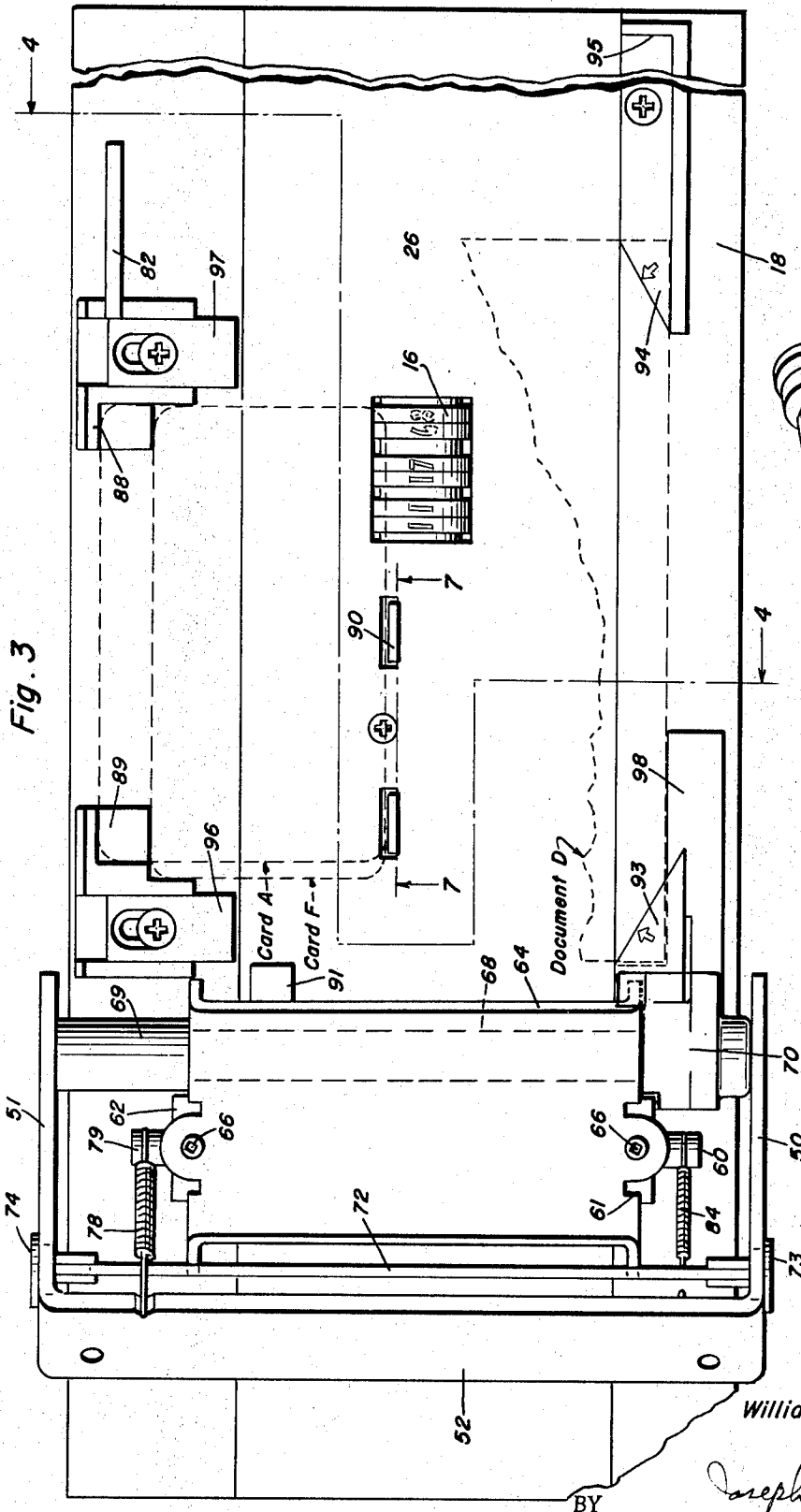
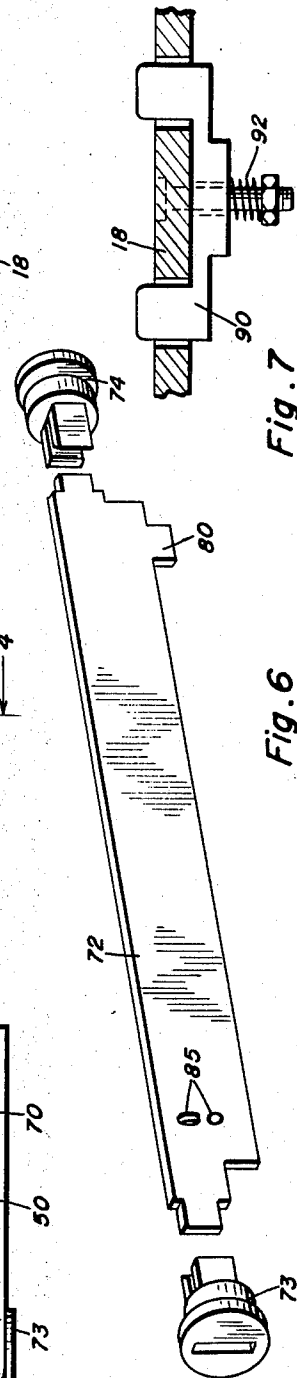
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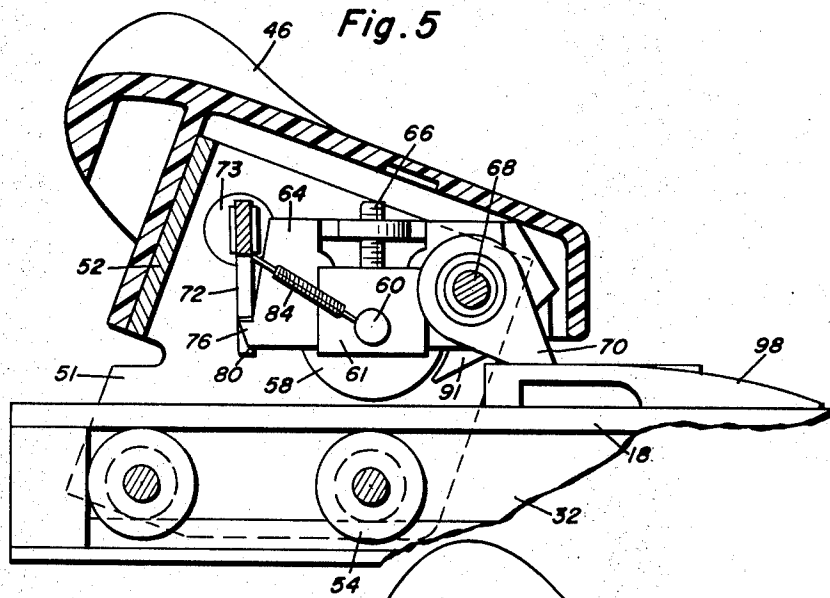


Fig. 5a

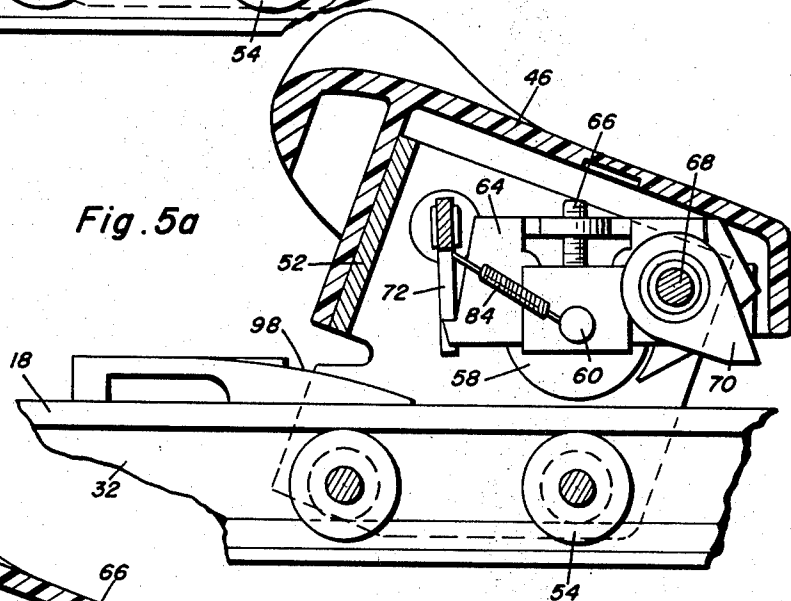
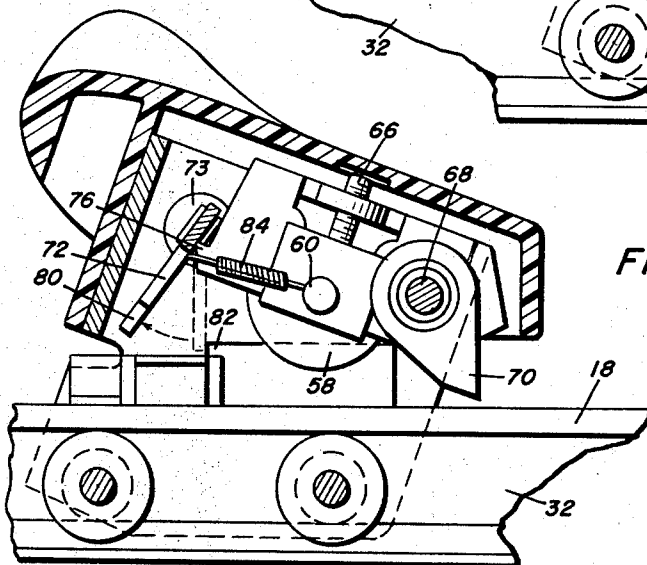


Fig. 5b



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LATCH MEANS FOR A TRAVELING ROLLER PLATEN ON A SWINGABLE CARRIAGE

This invention relates to imprinters and more particularly to the rolling platen type of imprinter which forms print impressions on one or more sheets by rolling the platen over the sheets while they engage the face of portable printing plate such as a card containing raised type faces. Often such cards are embossed, plastic credit cards, and the sheets are formed in sets containing one or more carbons and one or more partially and/or noninked sheets.

At the present time, many credit card imprinters are in use, and for various reasons the rolling platen type is the most common. The documents produced by these imprinters either are, or can be, used in automatic data processing systems having an optical character reading machine to read and encode the imprinted information. Good print quality is essential for modern reading machines to operate satisfactorily.

Most imprinters make good quality print impressions when they are first placed in service. But, in wearing in or under sustained usage, print quality often becomes objectionably poor. Also, print quality is compromised by rough usage and/or the wide ranges of temperature, humidity and dust environments in which imprinters must operate. In many cases, print quality can be restored by field adjustment or factory refurbishment. However, this is both bothersome and costly. In too many cases the user of the imprinter is indifferent to the quality of print or worse, an untrained user will attempt adjustment or make improvised corrections which almost invariably do more harm than good.

An object of my invention is to provide an imprinter which will withstand normal rugged field operation with very little, if any, attention required by the imprinter.

Another object of my invention is to provide an imprinter capable of excellent print quality and of maintaining a satisfactory degree of excellence over long periods of time and under the usual, often severe, field conditions.

These objects and others, are achieved in a large measure by my arrangement of imprinter parts and particularly certain geometrical relationships involving load bearing and load distribution within the imprinter. At least partially due to these relationships, my imprinter carriage is much easier to operate than many commercially used imprinters, and not only is this a convenience but it also enables the user to be more gentle in his usage of the imprinter. In turn, this contributes to longevity and the preservation of satisfactory print quality capability.

A feature of my invention is a latch and associated roller-platen frame mechanism which are arranged, constructed and interrelated in a manner to keep a precise platen-to-bed tolerance over continual, rough usage. Yet the latch and mechanism are mechanically simple.

While an objective of my invention is a rugged, reliable but simple imprinter, a rather difficult problem is recognized. The height of raised characters of the ordinary embossed plastic printing plate (credit card) varies and/or the thickness of the sheet or card sets also varies depending upon its number of plies. In one embodiment of my invention, the average combined thickness of a printing plate and sheet set is used for manually setting (e.g., a factory adjustment) the distance between the roller platen and the bed plate of the imprinter. That distance is retained over extensive use of the imprinter owing to the construction of my imprinter. But the distance is obviously a compromise.

Others have coped with the above problem by various means known in the art such as dynamically adjusting the platen-to-bed distance. At a much smaller sacrifice of simplicity, another embodiment of my invention copes with this problem by a segmented roller platen of unique construction enabling its segments to yield independently of each other through a limited range. More particularly, the segments are resiliently preloaded on the roller platen shaft in a manner which allows them to yield upwardly and downwardly but not so far downwardly that they contact the surface of the papers located on the printing plate which would cause smudges,

such as are often found near characters imprinted with a poorly adjusted imprinter.

Other objects and features will become apparent in following the description of the illustrated embodiments of the invention.

FIG. 1 is a perspective view of an imprinter constructed in accordance with the invention.

FIG. 2 is a longitudinal sectional view of the imprinter.

FIG. 3 is a top view of the imprinter with the carriage cover removed to show details which would otherwise be obscured.

FIG. 4 is a transverse sectional view taken approximately on the line 4-4 of FIG. 3.

FIG. 5 is a fragmentary sectional view similar to that of FIG. 2 showing the imprinter at the start of a cycle of operation.

FIG. 5a is a sectional view similar to that of FIG. 5 showing the imprinter near the completion of the imprint stroke.

FIG. 5b is another sectional view similar to that of FIG. 5 showing the imprinter at the end of its imprint stroke with the latch mechanism released.

FIG. 6 is a perspective view of a part of a latch used in the imprinter carriage.

FIG. 7 is a sectional view taken on the line 7-7 of FIG. 3.

FIG. 8 is a schematic elevational view of a modified roller platen for the imprinter.

FIG. 9 is a sectional view taken on the line 9-9 of FIG. 8.

The illustrated embodiment (FIG. 1) of my printing machine or imprinter 10 is the manually operated type. A printing plate, e.g., card A or card F (FIG. 3) is located as shown on the imprinter, and a document D such as a sheet or card-sheet set, is placed over the printing plate. Carriage 12 is moved from the rest position (FIG. 1) to the right through a rectilinear, imprint stroke and then returned. During the imprint stroke, the faces of the printing plate cause an imprint to be made on the document in a manner which is thoroughly known. Impressions are similarly caused by the conventional "dealer" plate 14 and the equally conventional "amount" and/or "date" wheel assembly 16.

Imprinter 10 has a base 18 of low profile and is approximately channel shape (FIG. 4) in section. As such, the base has sides 20 and 22 together with a connecting upper member 24. The slightly raised top surface of member 24 constitutes the bed plate 26 of the imprinter. Antislip rubber strips 30 are adhered to the lower surfaces of frame sides 20 and 22. Left and right tracks 32 and 34 are formed in frame sides 20 and 22, and each track has an upper and lower rail. There are rails 36, 37 of track 32 and rails 38, 39 of track 34. One purpose of the tracks is to support carriage 12 as described later. Carriage stops 40 such as rubber bumpers, are secured in the ends of the tracks by any means such as the transverse anchor 42 (FIG. 4) whose enlarged ends are accepted by a press fit within pockets formed in the stops. Finish plates 44 are attached to the ends of the base for decorative purposes only.

Carriage 12 has a cover 46 shaped irregularly for comfort as a hand grip for the user of the imprinter. Structurally, carriage 12 is made of a main frame having flat sides 50 and 51 (FIGS. 3 and 4) which straddle base 18, together with a connecting rear cross member 52. Cover 46 is attached by screws 53 or other means to member 52. Rotatable means consisting of four sets of rollers connected to sides 50 and 51 and operable in tracks 32 and 34, support the carriage for movement through imprint and return strokes. The front two sets of rollers are identical, the set 54 (FIG. 4) being shown in detail. It consists of a spindle attached to side 50 and provided with a larger roller 55 engaging upper rail 36 and a smaller roller 56 engaging lower rail 37. Roller 55 plays an important part in the operation of the imprinter, and it is preferably provided with an antifriction bearing, while roller 56 can be a simple plastic wheel. The two sets of rear rollers of the carriage are similarly engaged with the rails of the tracks, but there is no need for the antifriction bearing as explained later.

Carriage 12 supports a platen made of a hard cylindrical roller 58 rotatable freely on its shaft 60 by antifriction

bearings. Shaft 60 is mounted in pillow blocks 61 and 62 which are vertically adjustably connected to the sides of a U-shaped platen frame 64. The pillow blocks can, for example, be provided with ways (FIG. 2) which receive confronting edge portions of side slots in platen frame 64. Setscrews 66 threaded through the top of frame 64 are rotationally captive in the pillow blocks to affect adjustment of the platen with respect to bed plate 26. Setscrews 66 are thus normally held in a fixed axial position in the pillow blocks but are capable of rotation whereby their threaded connection with frame 64 adjusts the effective distance between the bed plate 26 and platen 58. The adjustment described is normally a factory adjustment.

The entire platen assembly is mounted for pivotal motion (compare FIGS. 5a and 5b) between the sides of the carriage main frame. To accomplish this, shaft 68 is mounted in the main frame sides 50 and 52 and it extends through aligned openings in the sides of platen frame 64. Spacer sleeve 69 is on shaft 68 between one side of the platen frame and main frame side 51. Cam follower 70 whose primary function is described later, serves as a spacer between the platen frame and side 50 of the main frame.

The platen assembly is permitted only limited pivotal movement between a lowered, imprint position during the imprint stroke of the carriage and a raised, nonimprint position during the carriage return stroke. Accordingly, there is a latch to hold the platen frame in the lowered pivotal position. The latch includes a latch member 72 (FIG. 6) made of a flat plate with reduced ends which fit into slotted bearings 73 and 74. The bearings are shouldered as shown to fit in aligned openings in the sides 50 and 51 of the carriage frame. The rear lower parts (FIG. 2) of the sides of platen frame 64 are provided with latch keepers 76. When the platen assembly is latched down, keepers 76 are pressed against the lower edge of latch member 72 by the action of the platen frame elevating spring 78. This spring (FIG. 3 and 4) has its ends attached to the rear 52 of the carriage frame and to a stud 79 projecting from pillow block 62, although other points of attachment to the platen frame can be selected. When the platen assembly is latched down in the imprint position, the distance between the platen roller 58 and the bed plate 26 is fixed as predetermined by adjustment of setscrews 66.

For the return stroke of the carriage, the latch is released, allowing spring 78 to pivotally lift the platen assembly a through an angle sufficient for platen roller 58 to be elevated a considerable distance above the bed plate. Latch release is accomplished by projection 80 (FIGS. 6 and 5b) of latch member 72 engaging an abutment 82 on the top of base 18 to one side of the bed plate surface and near the end of the allowable carriage motion during its imprint stroke. Upon engagement of abutment 82 by projection 80, latch member 72 is pivoted (FIG. 5b) against the bias of latch spring 84 which is attached in holes 85 in member 72 and to an end of shaft 60. The pivoting of latch member 72 releases the lower edge of the latch member from engagement with latch keepers 76. Thus, frame elevating spring 78 is allowed to react, pivotally elevating the platen assembly. When elevated, latch spring 84 presses the face of latch member 72 against keepers 76, to be prepared to be returned by spring 84 to the latching position.

In using the imprinter, credit card A is disposed between walls of the locating pieces 88 and 89 which are simple plastic members molded to suit the purpose and attached to the top of base 18. If card F of a different size is used, other walls of the pieces 88 and 89 are used for card location. For either card, the same card centering stop 90 (FIGS. 3 and 7) is used. The centering stop is composed of bifurcated member projecting in two places upwardly through slots in the bed plate and presenting two lateral faces for engagement with one edge of card A or card F. Spring assembly 92, obvious in its construction gently holds the card centering stop up and allows it to be depressed easily by the platen during the imprint operation.

Assuming the wheels of assembly 16 have been set properly, document D of one of the kinds described before, is placed on

the bed plate. Two corners are slipped into the locating pockets 93 and 94 which are preferably in plastic parts attached to the top of base 18 at the places shown, i.e., to one side of the bed plate surface. The locating pockets are flat and shallow and their card-corner entrances confront and are spaced from each other. For a larger document, one corner is placed in pocket 93 and the other is fitted in the open pocket 95. For either size document, the edge nearest the credit card abuts the vertical walls of stops 96 and 97 which are adjustably attached to, or form subassemblies with, the card locating pieces 88 and 89.

With carriage 12 in the rest position (FIG. 1), the platen latched down (FIG. 5), the printing plate (e.g., embossed credit card) and document in place as described, the imprinter is ready for a cycle of operation. Carriage 12 is moved to the right (FIG. 2) and the platen roller contacts the document whose edge is guided down by guide 91 projecting forwardly from pillow block 62. Then a print impression is made on the document by the platen roller compressing the document upon the raised faces of the credit card located on the bed plate. The mechanical reaction to printing in this manner is transmitted from the platen roller to its frame 64 by way of shaft 60 (see FIG. 5a for the following geometrical relationships). The reactive force is, in turn, transmitted to the carriage frame sides via latch member 72 and platen frame shaft 68 which are, by design, fore and aft of the axis of the platen roller. The front sets 54 of rollers which couple the carriage to the base, have a common axis directly below and parallel to the axis of the platen roller. The front sets 54 of rollers were described before as preferably provided with antifriction bearings. Their larger wheels transmit the major portion of the mechanical reaction to imprinting to the upper rails 36 and 38 of the imprinter tracks 32 and 34. The resultant of reaction forces is along a vertical line through the spindles of the front wheels and the platen roller shaft 60.

As the carriage is moved to completion of the imprint stroke (FIG. 5a) the latch member 72 is released from engagement with keepers 76 of the platen frame by engagement of the abutment 80 with stop 82. As described before, springs 78 and 84 go into action holding the platen frame pivotally elevated and the latch cocked. Carriage 12 is manually returned. While returning, cam follower 70 which is secured to a side of the platen frame 64, or to shaft 68 which is in turn, secured to frame 64, rides upon the ramp of cam 98 attached to base 18. The action of the cam follower on the cam pivots the platen frame (counterclockwise as shown) downward against spring 78 to a point at which the latch member 72 snaps into latching engagement with latch keepers (FIG. 5). The imprinter is, therefore, prepared for another imprinting cycle of operation.

While platen roller 58 has been characterized as hard, and the roller-to-bed distance fixed for imprint, there are certain unavoidable variables encountered in the field which compromise print quality. For example, the embossed characters of credit cards become worn and/or slightly smashed by use and abuse. Sometimes thick documents are used which also affects the credit card used with them. All too often the characters are not uniformly worn (depressed) resulting in an imprint containing some bold and some faint characters. Such a credit card C is shown in FIGS. 8 and 9 illustrating another embodiment of my imprinter. An identical problem is presented when the credit card is either higher or lower than the dealer plate 14 on an imprinter.

In FIGS. 8 and 9 it is to be understood that the imprinter is identical to imprinter 10, except that platen roller 58 and its shaft 60 are replaced by platen roller 58a and its shaft 60a. The roller 58a is composed of a group of preloaded cylindrical segments capable of independently moving radially against the yielding preload to conform (FIG. 8) to the different elevations of the print faces of the printing plate (credit card) to compensate for differences in elevation with the same card and/or to compensate for differences in total thicknesses of sets of a card and a document.

Each segment 100 of roller 58a is composed of a rim 102 of hard material such as certain plastics and most metals. Segment hub 104 is freely rotatable on shaft 60a and has either separate or integral, curved spokes 106 whose enlarged outer ends nest in pockets 108 formed in the inner surfaces of the rim. If the spokes and hubs are integral, the selected material must have sufficient resilience for the spokes to function as leaf springs. The illustrated curvature of the spokes is for that purpose. Thus, the construction of each segment is such that the spokes resiliently preload the rim, holding it in yielding concentricity with shaft 60a. Each segment can independently conform to the different elevations (FIG. 8) and return to its original position upon completion of an imprint operation.

The illustrated and described embodiments of the invention are given by way of example only.

I claim:

1. A printing machine for forming print impressions on a sheet juxtaposed with a portable printing plate having raised faces, said machine comprising a base including a bed plate on which the printing plate is adapted to be located, a carriage adapted to be moved rectilinearly along said base from a rest position through an imprinting stroke to a second position and from said second position through a return nonprint stroke to said rest position, tracks along opposite sides of said base, each track having an upper rail and a lower rail, rotatable means for engaging all of said rails and rectilinearly movably connecting said carriage to said base for movement of said carriage between said rest and said second positions, said upper rails bearing the major portion of the mechanical reaction to imprinting on the imprinting stroke, a platen, a platen frame connected to and supporting said platen in juxtaposition to said bed plate, means for pivotally connecting said frame to said carriage to allow movement of said platen between a lowered and a raised position with respect to said bed plate, said platen remaining on one side of the pivot axis of said frame at all times, yielding means to pivotally bias said frame and platen in a raised direction, a latch, connected to the carriage and said frame to releasably hold said frame in the platen lowered position, said latch having a latch member to engage said frame and form an abutment against which said frame presses to establish said lowered position of the frame, resilient means retaining said latch member in the position at which it forms the abutment for said frame and holds said frame in a lowered position such that said platen is located a predetermined distance above said bed plate during said imprinting stroke of the carriage, and portions of said rotatable means engaging said tracks below said platen at such position relative to said platen that said portions accept the major part of the mechanical reactive force of imprinting transmitted from said platen to said tracks by way of said frame and said latch member and said carriage, and stop means on the base engageable with the latch member whereby said stop means unlatches said frame and enables the platen frame to move to an elevated position after the imprinter completes said imprinting stroke.

2. The printing machine of claim 1 wherein said platen includes a roller, a shaft supporting said roller, and means connecting said shaft to said frame.

3. The printing machine of claim 2 wherein said roller has a plurality of segments, at least one segment having a rim and a hub, and resilient means reacting between said hub and said rim yieldingly opposing radial movement of said rim thereby enabling the impression forming surface of said rim to vertically adjust to the combined height of the sheet and the raised faces of said printing plate.

4. The printing machine of claim 1 wherein said latch member is pivoted to said carriage, said stop means being in the path of carriage movement at the completion of the imprinting stroke for releasing said latch member from abutting relationship with said frame by pivotally moving the latch

member and overcoming said latch member resilient means thereby enabling said yielding means to pivotally move said frame to the platen raised position at which said latch member contacts a part of said latch member in a nonabutment forming relation and holds said latch member in a predetermined position relative to said frame.

5. The printing machine of claim 4 and means in the path of said carriage movement during the return stroke of said carriage for pivotally moving said frame to the platen lowered position, during which pivotal movement said latch member is freed by said frame to pivotally move under the force of said resilient means to the position at which said latch member engages said frame and forms an abutment therefor.

6. The printing machine of claim 1 wherein said rotatable means comprise front and rear sets of rollers on each side of said carriage, one roller of each of said sets operable with said top rails and one other roller of each set operable with said bottom rails, and said portions of said rotatable means comprising one set of rollers on one side of the carriage and the corresponding set on the opposite side of the carriage.

7. The printing machine of claim 6 wherein the last-mentioned sets of rollers are coaxial with an axis transverse to the movement of said carriage, and the resultant of the reactive forces to imprinting being in a direction which passes approximately through said axis and tends to press rollers of the last-mentioned sets against one rail of each track.

8. In a printing machine for forming print impressions on a sheet juxtaposed with a portable printing plate having raised faces, a base having a bed plate to support the printing plate, a carriage adapted to be moved along said base from a rest position through an imprinting stroke to a second position and from said second position through a nonimprinting return stroke to said rest position, tracks along opposite sides of said base, means connecting said carriage to said base and including a left and right front roller and a left and right rear roller connected to said carriage and engaging said tracks, a roller platen, a platen frame, means forward of said left and right front rollers for pivoting said frame to said carriage, a latch connected to said carriage and engaging said frame to establish a lowered pivotal position of said frame during the imprinting stroke, means rotatively connecting said platen to said frame in a vertical plane behind said frame pivoting means and forwardly of the connection of said latch with said carriage and approximately vertically coplanar with the axis of said left and right front rollers, so that the last mentioned rollers transmit the major part of the reactive force of imprinting from said platen to said tracks by way of said latch and said frame pivoting means and said frame and said carriage.

9. The subject matter of claim 8 wherein said frame has a pair of sides to which said platen rotatively connecting means are coupled, said latch including a latch member having holding surfaces spaced from each other, and a latch keeper on each side of said frame with which said latch member surfaces are engageable to hold said frame in its lowered position.

10. The subject matter of claim 8 and said latch including a transverse latch member pivoted to said carriage, a latch spring exerting a force on said latch member in a direction to releasably hold said latch member in a position at which it forms an abutment for said frame to hold the frame rigidly against upward pivotal movement, a frame elevating spring reacting on said carriage, means in the path of travel of said latch member as said carriage is moved through said imprinting stroke for pivoting said latch member in a direction to release it from abutment relationship with said frame and enable said frame elevating spring to pivotally lift said frame, said latch spring pressing a surface of said latch member against the elevated frame so that upon the lowering of said frame said latch member is pivoted by said latch spring to again form an abutment for the lowered frame and hold the latter against upward pivotal movement.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,538,848 Dated November 10, 1970
Inventor(s) William P. Barbour

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 4, "said latch member in" should read
-- said frame in --.

Signed and sealed this 27th day of April 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, .
Commissioner of Patents