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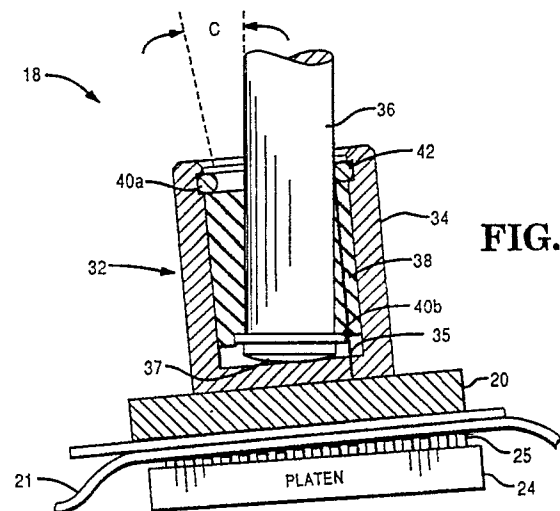
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54 **Printing recorder.**

57 A printing recorder has an endorser hammer joint (32) which enables rockable and lateral movement of a print hammer (20) in order to provide parallel alignment of the striking surface (22) of the print hammer (20) and a platen (24) when the print hammer (20) is engaged theragainst. The endorser hammer joint (32) includes a socket (34) having a bottom surface (35), a plunger (36) for engaging the socket (34), the plunger (36) having an end (37) contacting the bottom surface (35), and positioning means (38) for resiliently positioning the plunger end (37) in a home position on the bottom surface (35) and also for permitting rockable and lateral movement of the bottom surface (35) with respect to the plunger (36).



**FIG. 2**

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## PRINTING RECORDER

This invention relates to printing recorders for printing data on a document when in a printing position.

The invention has a particular application to document endorers.

Document endorers are used to print information on documents. In the financial industry, for example, document endorers are used to print information on the back of checks. Many document endorser of the past include a recorder or printer having a print hammer and a platen. Typically, the platen has information embossed thereon, and when it is desirable to print data on a document, the document is positioned between the platen and the print hammer whereupon a solenoid forces the striking surface of the print hammer against the platen to effect the printing. A problem with these document endorser systems is that the platen may not be mounted parallel to the striking surface of the print hammer. In addition, the information may be unevenly embossed on the platen. In either case, the misaligned striking surface may not engage the platen completely or evenly, thereby resulting in some of the information embossed on the platen not being printed on the document, or if the striking surface does engage the platen completely, the printing on the document may be uneven. Adjusting the document endorser system so that the platen is aligned parallel to the striking surface results in "down time" and requires a service call which is expensive.

It is an object of the present invention to provide a printing recorder which produces high quality printed documents.

Therefore, according to the present invention, there is provided a recorder for printing data on a document when in a printing position, including: a print hammer having a striking surface; a platen in opposed relationship to said striking surface, said document being positioned between said platen and said striking surface when in said printing position; and a solenoid having an armature adapted to move said striking surface of said print hammer towards said document and said platen for printing data on said document, characterized by a floating joint operatively coupling said print hammer to said solenoid and adapted to provide alignment between said striking surface and said platen, said floating joint including; a socket having a generally flat bottom surface; a plunger adapted to be moved by said armature and having an engaging end adapted to contact said flat bottom surface, positioning means adapted to normally bias said plunger to a home position substantially normal to said flat bottom surface and also to permit rockable

and lateral movement of said bottom surface with respect to said plunger whereby said floating joint enables said striking surface of said print hammer to rock and move laterally with respect to said plunger in order to provide substantially parallel alignment of said print hammer striking surface and said platen when said print hammer is engaged thereagainst.

It will be appreciated that in a printing recorder according to the invention, a high print quality is achieved by virtue of the rockable and lateral movement of the print hammer relative to the plunger, which enables good alignment of the print hammer with the platen. A further advantage is that the printing recorder is easy and inexpensive to manufacture.

One embodiment of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a partially sectioned top view of the preferred embodiment of this invention, showing a plunger in a home position in a socket;

Fig. 2 is a partially sectioned top view of the preferred embodiment of this invention, showing a print hammer engaging a misaligned platen;

Fig. 3 is a top view of the preferred embodiment of the invention, showing the flexibility of a preferred embodiment of this invention; and

Fig. 4 shows a check endorser system in which the apparatus of the invention might be used.

Fig. 1 is a top view of a preferred embodiment of this invention, designated generally as recorder 18. The recorder 18 is generally comprised of a print hammer 20 having a striking surface 22. In a preferred embodiment, the striking surface 22. In a preferred embodiment, the striking surface 22 has dimensions of about 44 x 51 millimetres (1.75 x 2.00 inches). A platen 24 having a size comparable to print hammer 20 lies in opposed relationship to striking surface 22. The information 25 to be printed on a document 26 is embossed directly on platen 24. Alternatively, information 25 can be embossed on striking surface 22, or the information 25 can be carried on a plate (not shown) which is separately mounted on either platen 24 or striking surface 22. The recorder 18 includes a solenoid 28 having an armature 29 which is secured to one end of a plunger 36 by any suitable means, such as a threaded sleeve 30. When it is desirable to print information 25 on document 26, document 26 is positioned at a printing position, designated by arrow B in Fig. 1 between striking surface 22 and platen 24. The solenoid then moves striking surface 22 of print hammer 20 against document 26 and platen 24, thereby effecting the printing of informa-

tion 25 on document 26. It may be desirable to secure a resilient face 22a (such as rubber) to striking surface 22, as shown in Fig. 3, in order to make striking surface 22 more resilient. Recorder 18 may include an ink ribbon 21 which lies between platen 24 and document 26.

The recorder 18 also includes a floating joint, designated as 32 in Fig. 1, operatively coupling print hammer 20 to armature 29 of solenoid 28. The function of floating joint 32 is to provide parallel alignment between striking surface 22 of print hammer 20 and platen 24 when said platen 24 is struck by print hammer 20. The floating joint 32 includes a socket 34 having a generally flat bottom surface 35. The socket 34 is secured to print hammer 20 by, for example, welding it thereto. Notice that socket 34 could be manufactured by welding a hollow tubular member (not shown) directly to print hammer 20 on the opposite side of striking surface 22, with the side of print hammer 20 opposite striking surface 22 providing the flat bottom surface 35. In a preferred embodiment, floating joint 32 includes a plunger 36 which has an end 37 contacting flat bottom surface 35. The other end of plunger 36 is coupled by sleeve 30 to armature 29 as previously mentioned. Although not shown in Figs. 1-3, plunger 36 could be an extension of armature 29. In a preferred embodiment, print hammer 20 and plunger 36 are made of metal; however, they could be made of any suitable material, such as hard plastic. In addition, plunger 36 and socket 34 could vary in size to achieve the amount of flexibility desired. A typical socket 34 has an inside diameter of about 13 millimetres (0.50 inch), and a typical plunger 36 has an outside diameter of about 6 millimetres (0.25 inch). The end 37 could be any shape, such as flat, convex or spherical.

The floating joint 32 further includes a positioning means 38 disposed between plunger 36 and socket 34 for normally biasing plunger 36 to a home position substantially normal to flat bottom surface 35, as best shown in Fig. 1. The function of positioning means 38 is to permit flat bottom surface 35 and print hammer 20 to pivot or rock and to move laterally with respect of plunger 36. In a preferred embodiment, positioning means 38 is made of rubber; however, it could be made of any suitable resilient material. The positioning means 38 includes a retaining means for retaining plunger 36 in socket 34. The retaining means include a first retaining ring 40a secured to groove 42 in socket 34 and a second retaining ring 40b secured to plunger 36. The first and second retaining rings, 40a and 40b respectively could be any suitable fasteners, such as conventional C-clips. The retaining rings 40a and 40b cooperate with positioning means 38 described above to retain plunger 36 in

socket 34 and to resiliently bias plunger 36 to home position shown in Fig. 1. An alternative to using retaining rings 40a and 40b, would be to permanently position the positioning means 38 between plunger 36 and socket 34 by using an adhesive, for example.

As best illustrated in Fig. 2 floating joint 32 enables striking surface 22 of print hammer 20 to pivot and move laterally with respect to plunger 36 when striking surface 22 engages a platen 24 that is not properly aligned therewith. Angle C in Fig. 2 indicates the flexibility that floating joint 32 gives print hammer 20. A solenoid 28 forces plunger end 37 further against flat bottom surface 35, flat bottom surface 35 rocks and moves laterally with respect to plunger end 37 to accommodate the misalignment between print hammer 20 and platen 24. This movement of print hammer 20 provides parallel alignment of striking surface 22 and platen 24 when solenoid 28 is energized to engage striking surface 22 against document 26 and platen 24. Thus, floating joint 32 permits a high flexibility in print hammer 20, and it also properly aligns striking surface 22 with platen 24. Notice also that the force from solenoid 28 is distributed evenly across striking surface 22, resulting in good printing quality of recorder 18.

Referring now to Fig. 4 there is shown a typical check endorser system 41 in which the apparatus of this invention might be used. The endorser system 41 includes recorder 18 described above and also comprises means including a document track 42 for guiding a check 50 to the printing position between print hammer 20 and platen 24, as indicated by arrow D in fig. 4. The print hammer 20 and platen 24 are operatively located in opposed relationship on either side of track 42. The endorser system 41 also includes conveyor means for controlling the movement of check 50 in document track 42. The conveyor means has a motor 46 which drives the drive rollers 44a and 44b. The drive rollers 44a and 44b contact with pinch rollers 44c and 44d, respectively, to position check 50 at the printing position. A controller 48 is included in endorser system 41 to control endorser system 41, motor 46, and solenoid 28. After check 50 has been positioned at the printing position, information 25 can be printed thereon by recorder 18 as described above. If, for example, platen 24 is mounted in a misaligned relationship relative to print hammer 20, floating joint 32 will permit print hammer 20 to properly align therewith. In addition, if information 25 is of different heights, floating joint 32 will again pivot and move laterally to accommodate for the misaligned information 25.

## Claims

1. A recorder for printing data on a document (26) when in a printing position, including: a print hammer (20) having a striking surface (22); a platen (24) in opposed relationship to said striking surface (28), said document (26) being positioned between said platen (24) and said striking surface (22) when in said printing position; and a solenoid (28) having an armature (29) adapted to move said striking surface (22) of said print hammer (20) towards said document (26) and said platen (24) for printing data on said document, characterized by a floating joint (32) operatively coupling said print hammer (20) to said solenoid (28) and adapted to provide alignment between said striking surface (22) and said platen (24), said floating joint (32) including; a socket (34) having a generally flat bottom surface (35); a plunger (36) adapted to be moved by said armature (29) and having an engaging end (37) adapted to contact said flat bottom surface (35); and positioning means (38) adapted to normally bias said plunger (36) to a home position substantially normal to said flat bottom surface (35) and also to permit rockable and lateral movement of said bottom surface (35) with respect to said plunger (36) whereby said floating joint (32) enables said striking surface (22) of said print hammer (20) to rock and move laterally with respect to said plunger (36) in order to provide substantially parallel alignment of said print hammer striking surface (22) and said platen (24) when said print hammer (20) is engaged thereagainst.
 

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2. A recorder according to claim 1, characterized in that said socket (34) is secured to said print hammer (20) and said plunger (36) is secured to said armature (29).
 

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3. A recorder according to claim 1 or claim 2, characterized in that said data is embossed on said platen (24).
4. A recorder according to anyone of the preceding claims, characterized in that said positioning means include an insert (38) formed of resilient material and positioned between said plunger (36) and said socket (34).
 

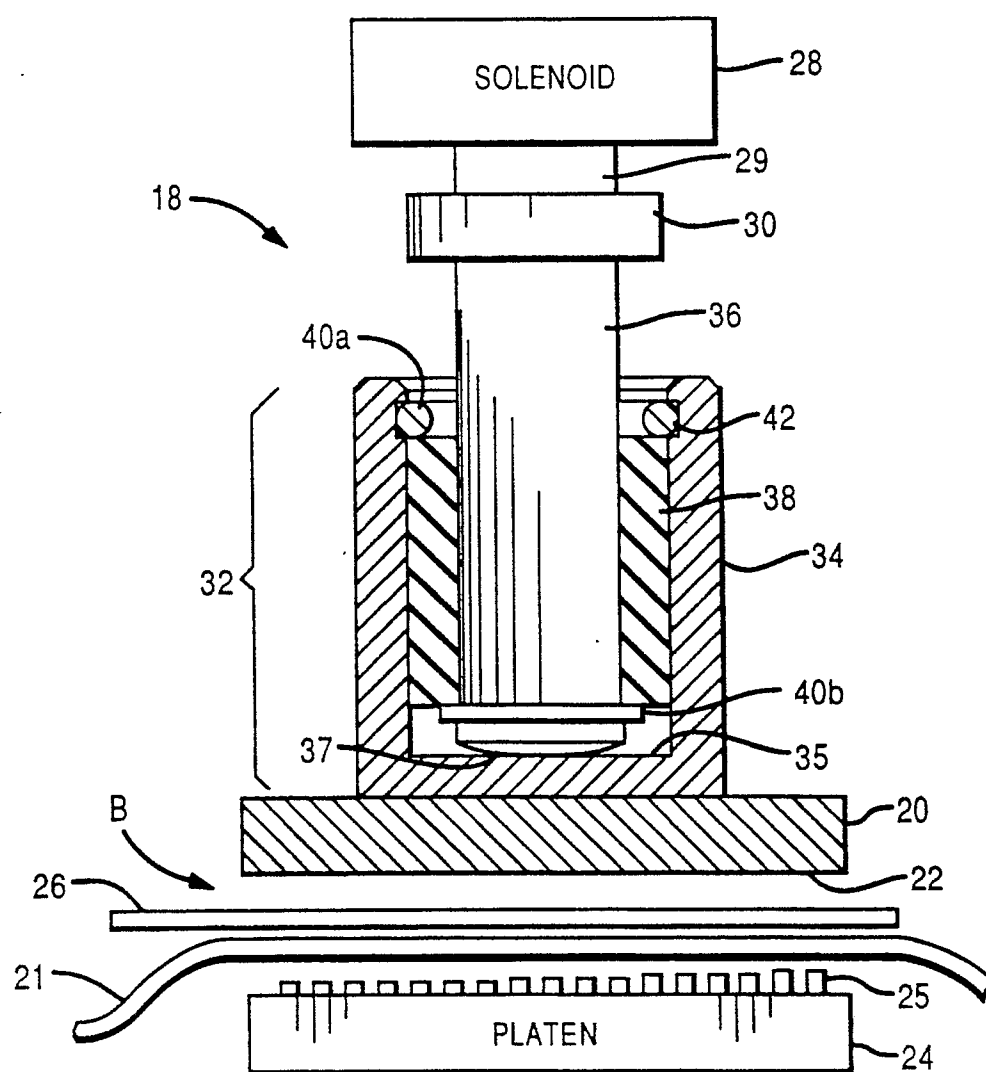
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5. A recorder according to claim 4, characterized in that said positioning means further includes retaining means (40a, 40b) for retaining said plunger in said socket, said retaining means including a first retaining ring (40a) secured to said socket (34) and a second retaining ring (40b) secured to said plunger (36), wherein said retaining rings (40a, 40b) cooperate with said insert (38) to retain said plunger (36) in said socket (34) and to resiliently bias said plunger (36) to said home position.
 

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6. A recorder according to any one of the preceding claims, characterized in that said engaging end (37) of said plunger (36) has a spherical shape.
 

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7. A recorder according to any one of the preced-

ing claims, characterized in that said striking surface (22) has a resilient face (22a) secured thereto.

**FIG. 1**



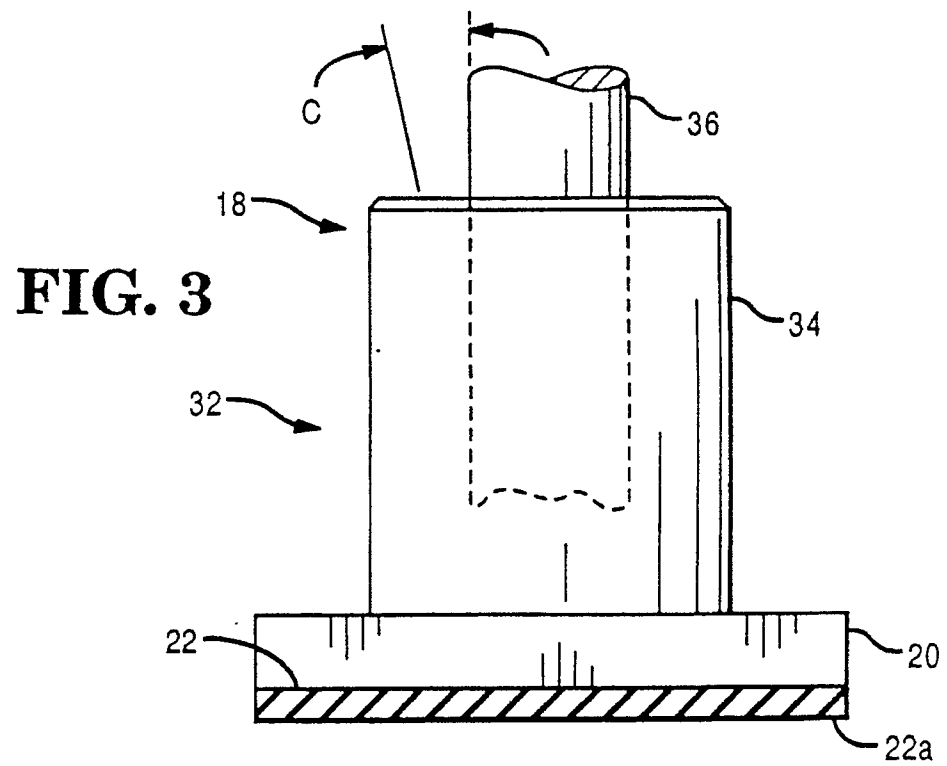
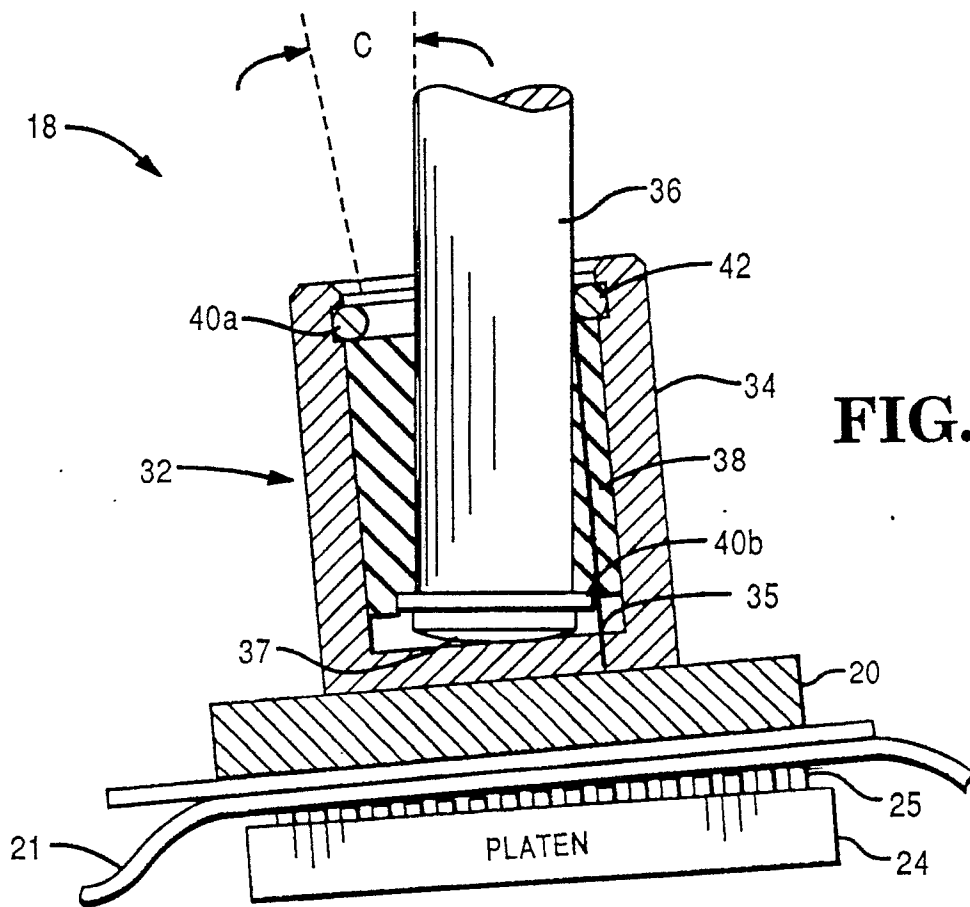
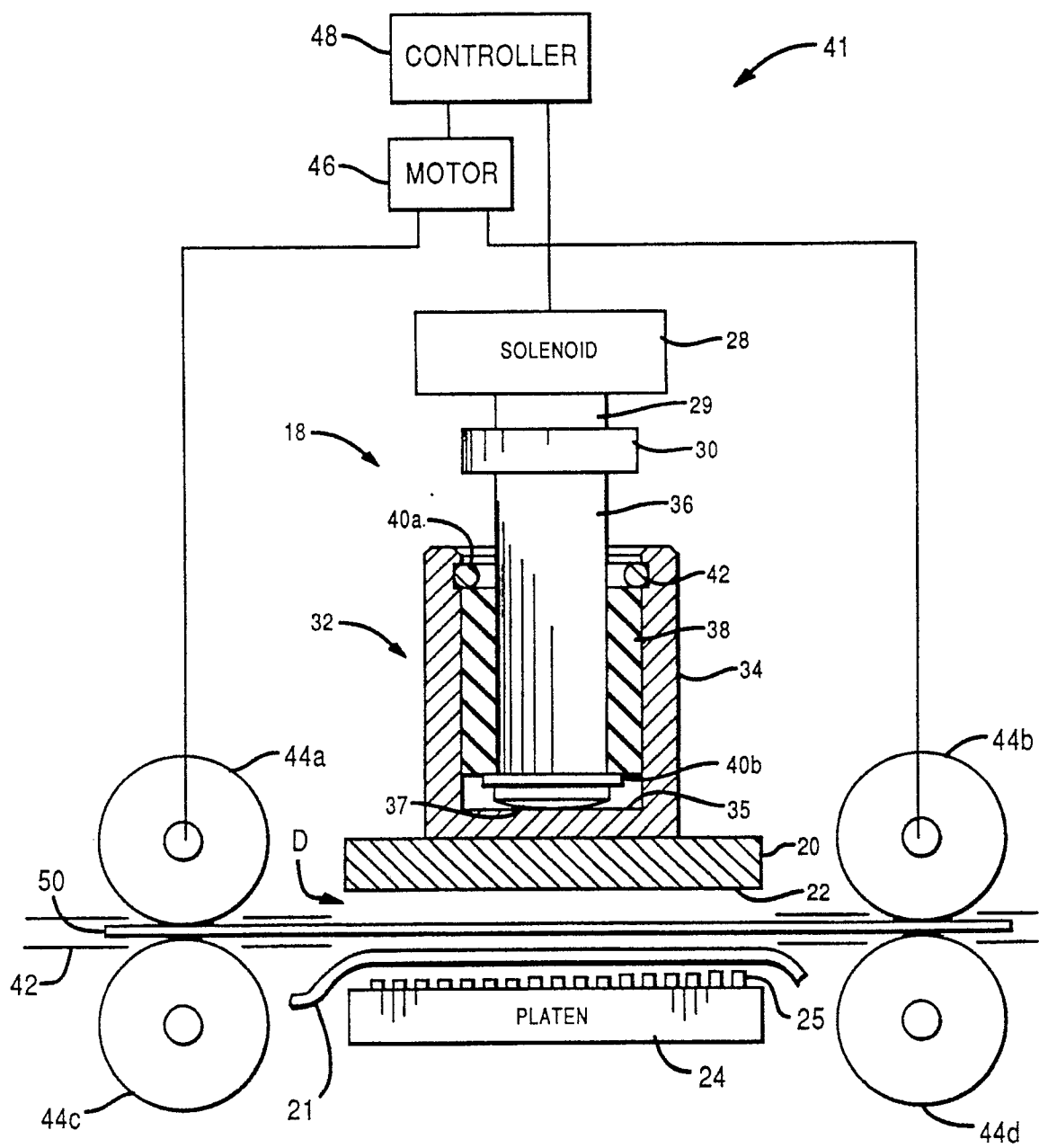


FIG. 4





DOCUMENTS CONSIDERED TO BE RELEVANT			EP 90306971.4
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.')
P, X	<u>EP - A2 - 0 359 578</u> (NCR CORP.) * Fig. 10 * --	1, 2, 6	B 41 J 9/00 B 41 K 3/02
A	<u>US - A - 4 541 338</u> (LAVERICK) * Totality * --	1	
A	<u>DE - A1 - 3 511 298</u> (BAUER) * Totality * --	1	
A	<u>US - A - 4 181 560</u> (MAITLAND)  -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.')
Place of search VIENNA			Examiner WITTMANN
Date of completion of the search 12-09-1990			
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons  & : member of the same patent family, corresponding document	