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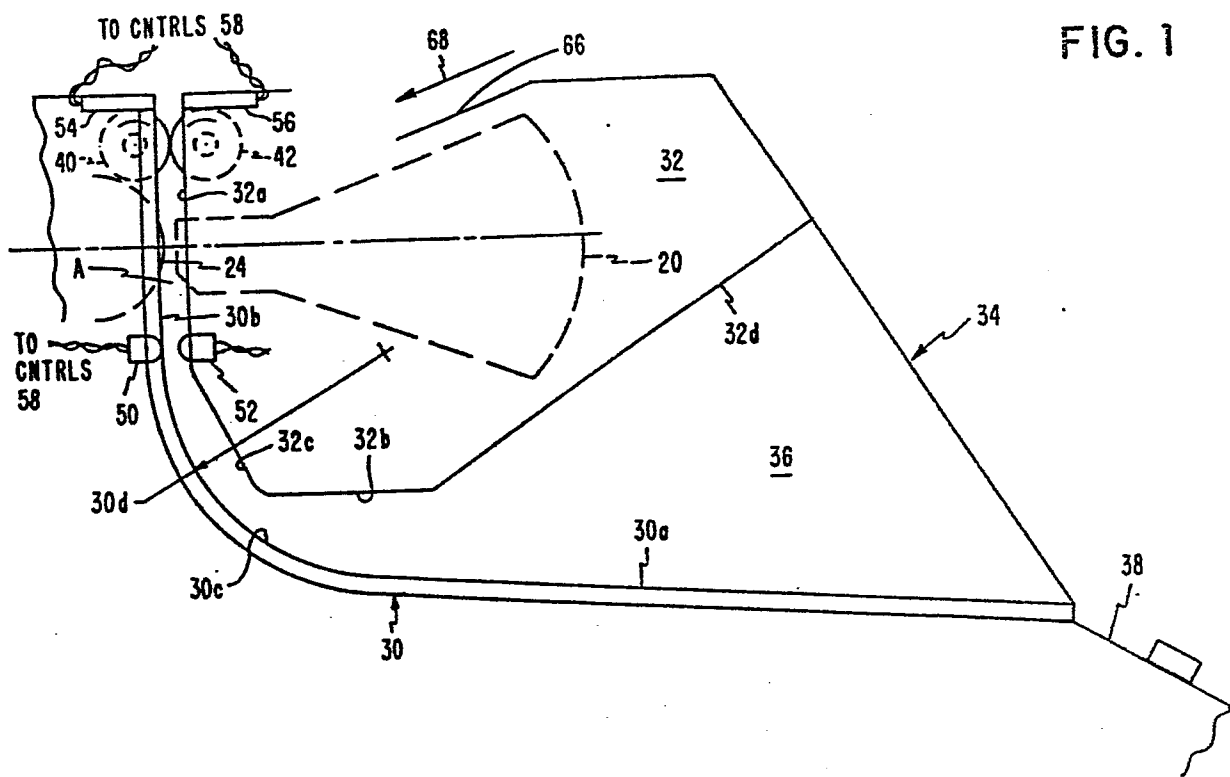
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⑤④ Printing or other recording apparatus.

⑤⑦ Printing apparatus comprising a flat, substantially horizontal, guide portion (30a) on which the document to be printed is initially placed by an operator, a curved guide portion (30c) over which the operator pushes the document, and a final vertical guide portion (30b) providing the back wall of a vertical passage (A) across which a print head (20) traverses for the purpose of printing on the document as it moves upwardly through the vertical passage (A). Drive rolls (40, 42) are provided in the vertical passage (A) just above the line of traverse of the print head (20) for first continuously pulling the document upwardly through the passage once it has been manually pushed to this point and then incrementing the document upwardly through the machine and in the vertical passage (A) for each of the lines of print provided by the print head (20). A keyboard (38) is provided for entering data to be printed and the casing is apertured at (66) to enable the operator to see the print station along line of sight (68) Sensors (50, 52, 54, 56) control the drive motor of the rolls (40, 42).

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PRINTING OR OTHER RECORDING APPARATUS

The invention relates to recording apparatus, such as printing apparatus, and more particularly to recording apparatus for recording on discrete documents such as rectangular sales slips.

Prior conventional printing apparatus for sales slips, which have been incorporated in cash registers or point of sale terminals, have generally been what are known as "the vertical slot type" or "the flat bed type." In the vertical slot type, the document must be inserted in the side or top of the machine, an operation that is relatively inconvenient and awkward for an operator to perform. If small sales slips or other articles accidentally drop to the bottom of the slot, they are not retrievable by the operator, causing substantial trouble. Pressure rolls are provided for incrementing the document in its printing slot, and these are normally lifted either electro-magnetically or manually to insert the document.

With the flat bed type of printing apparatus, the printing is frequently reversed or upside down as the sales slip exits the machine and the slip must be reversed before it can be read. The number of lines of print are generally limited with this type of printing apparatus, and the lines of print are not visible to the operator substantially at the same time as they are printed so that errors are not readily apparent.

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It is an object of the present invention to provide improved recording apparatus which obviates or reduces the inconvenient or awkwardness experienced by operators in using some of the known recording apparatus. In particular it is an object of the invention to provide recording apparatus in which a discrete document on which matter is to be recorded is entered horizontally into the apparatus, a first operator facility, and is then turned through 90 degrees to travel vertically within the apparatus, which affords a second operator facility.

The invention provides operator controlled recording apparatus for recording matter on a discrete document entered into the apparatus by the operator and comprising a document transport path along which the document is transported within the apparatus, said apparatus being characterised in that the transport path comprises a document-receiving-and-guiding surface having an initial, externally accessible, entry, substantially horizontal, flat surface-portion on which the operator can position a document to be entered, followed by a contiguous upwardly directed, curved surface-portion which subtends an angle of substantially 90 degrees and changes the direction of movement of an entered document from a generally horizontal direction to a generally vertical direction.

Preferably the horizontal surface-portion provides the lower wall of a document entry zone, a side of which is provided by a substantially vertical side wall forming an edge alignment surface for the document and the top of which is provided by a top wall inclined downwardly towards the lower wall so that the entry zone tapers and decreases in height towards the curved surface-portion.

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Preferably the apparatus further comprises a casing substantially enclosing the portion of the transport path beyond the entry surface-portion, the recorded matter can be visibly read, and the casing is shaped and arranged and/or apertured so that the recorded matter is visible to the operator as or a short interval after it is recorded.

The invention further provides printing mechanism for printing transverse lines of print on an elongate document including a document guide having an initial substantially horizontal flat guide portion, a curved guide portion connected therewith extending for substantially a right angle and a final flat vertical portion providing a vertical passage through which the document may exit upwardly whereby the document can be deposited on the initial guide portion and can be pushed through the guide to exit therefrom substantially vertically, and a printer traversing across said guide for printing lines of print on the document as it moves along said guide, said printer comprising a transport mechanism including a pair of opposite rolls in said passage, motor means for driving the rolls so that the rolls propel the document upwardly in said passage, first sensor means located at the bottom end of said vertical passage and below said rolls for causing said motor means to continuously drive said rolls to propel the document upwardly in said passage and second sensor means located in said passage above said rolls for causing said motor means to discontinue the continuous rotation of the rolls and to incrementally drive them when the document passes the second named sensor means whereby the printer may be effective to traverse across said guide to print a line between increments of said document.

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Operator controlled recording apparatus embodying the invention will now be described by way of example with reference to the accompanying drawings, in which:-

FIG. 1 is a fragmentary side elevational view of the apparatus;

FIG. 2 is a fragmentary plan view, partially schematic, of the apparatus; and

FIG. 3 is a plan view of a document which may be printed by the printing apparatus.

In this example the apparatus is printing apparatus and comprises a print head 20 which may be reciprocated on a center line 22 by any suitable propelling mechanism. The print head 20 may be of the wire or ink jet printer type, for example; and it is disposed opposite a platen 24 for printing an elongate rectangular sales slip or other discrete document 26 resting against the platen 24. The motion of the print head 20 on the center line 22 may be sensed by any suitable sensing means, such as a sensor 28.

The apparatus comprises a lower guide 30 providing a document-receiving-and-guiding surface. The guide 30 comprises a nearly horizontal flat guide plate portion 30a, a vertical flat guide portion 30b and a curved guide portion 30c formed on a radius 30d connecting the guide portions 30a and 30b and extending for about 90 degrees. The apparatus also comprises an inner guide 32 which has a vertical surface 32a extending parallel with the guide portion 30b to provide a vertical passage A between these two surfaces, a horizontal guide surface 32b and a guide surface 32c extending upwardly at an angle with respect to the surface 32b, with the surfaces

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32b and 32c being disposed opposite the curved portion 30c of the lower guide 30. The guide 32 also has a surface 32d extending upwardly and at an acute angle with respect to the guide portion 30a so as to provide a document receiving throat 34. An aligning rail 36 for the document 26 forms one end of the throat 34 and acts to guide the document 26 into the apparatus. A keyboard 38 is provided in front of and below the aligning rail 36 and horizontal guide portion 30a as shown in FIGS. 1 and 2.

A pair of document drive rolls 40 and an opposite pair of pressure rolls 42 are provided in the passage A between the surface 32a and guide portion 30b. The pressure rolls 42 are held in forceful but yieldable relationship with the drive rolls 40 by any suitable means. The drive rolls 40 are propelled from a motor 44 through spur gears 46 and 48. The motor 44 is preferably of the electrical stepping type.

A pair of document sensors 50 and 52 are disposed at the bottom of the vertical passage A, and a pair of sensors 54 and 56 are disposed at the upper end of the passage A. The motor 44 is under the control of controls 58; and controls 58 are under the control of sensors 28, 50, 52, 54 and 56.

The keyboard 38 is connected to a memory 60 of any suitable type as by means of data transferring bus 62. Memory 60 is also connected to the print head 20 as by means of data transferring bus 64 and has control connections with controls 58.

In order to print the document 26, it is placed on the horizontal portion 30a of the lower guide 30 in a substantially horizontal disposition. The document is then manually pushed so that its forward end contacts the curved guide

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portion 30c, and the document is thus bent against whatever inherent resilience the document material may have and moves upwardly in the passage A. The forward end of the document 26 when it passes between the sensors 50 and 52 causes the controls 58 to so operate on the motor 44 that the motor drives the drive rolls 40 and thus the pressure rolls 42 at a continuous speed.

As the document 26 is moved farther upwardly in the passage A under manual force, its forward end eventually enters the nip between the rolls 40 and 42; and these rolls then move the document at a uniform speed upwardly in the passage A. When the forward end of the document passes between the sensors 54 and 56, these so operate on the controls 58 that the motor 44 is then caused to incrementally rotate the rolls 40; and the document incrementally moves upwardly in the passage A. The print head 20 under the control of controls 58 traverses across the document 26 for each of the increments of rotation of the rolls 40 and prints a line of print, such as the print line a, for the increment of rotation of the rolls 40. This printing occurs in the vertical passage A and on the platen 24 which supports the document during printing. The sensor 28 connected with the controls 58 assures that the motor 44 cannot be effective to provide another increment of rotation of the rolls 40 until a print line has been completed. Succeeding lines of print, such as lines b, c, d, etc., are printed on successive increments of rotation of the rolls 40.

The controls 58 may also be under the control of the keyboard 38 so that a reciprocation of the print head 20 does not take place until a line of print has been put into memory 60 by means of keyboard 38. In this case, the line of print a is first keyed into the keyboard 38 and is put into memory 60. The print head 20 then traverses across the

document 26 and prints the first line a. The drive rolls 40 are then effective to move the document 26 upwardly in the passage A for an additional increment; the keyboard 38 then has its second line of print entered into it and thereby into memory 60; and the print head 20 is then reciprocated and prints the second line of print b on the document 26. Subsequently, the document 26 is incrementally moved upwardly in the passage A; and the succeeding lines of print c, d, e, etc., are printed by the print head 20 as it traverses across the document 26.

The apparatus is provided with an opening 66 in its top so that there may be a line of sight 68 toward the platen 24. Thus, as each subsequent line is printed, the operator may check the accuracy of the printed line by viewing along the line of sight 68.

Advantageously, the printing apparatus allows the operator to lay the document 26 on a flat, substantially horizontal, bed (guide portion 30a) and to push it away from him into the machine, which is very natural from the operator's standpoint. The operator places the document 26 in contact with the aligning rail 36, which is on the right side of the line of movement of the document 26, into the apparatus; and the document 26 is thus registered in its proper line of movement. The document 26 is pushed straight in toward the back of the machine with a slight pressure sideways, to the right as seen in FIG. 2, to maintain registration of the document. The portion 30c of the lower guide 30 is formed on a generous radius (30d); and this may be, for example, 1 3/4 inches (4.44cm) to route the document 26 upwardly in passage A without any substantial manual force required in order to cause the document to bend through substantially 90° and without any permanent deformation or bend lines

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being provided in the document. The sensors 50 and 52 just above the radiused portion 30c of the guide 30 start the feed rolls 40 which need not be lifted or lowered to be effective; and once the document is under control of the feed rolls 40, the operator can relax his force to move the document upwardly through the vertical passage A. The document 26 is then automatically incremented through the printing transaction and is ejected out of the top of the passage A and out of the top of the machine to be readily available to the operator. Each of the line of print as it is caused by the keyboard 38, for example, is readily visible, right side up, to the operator on the line of sight 68 as head 20 moves along the centre line 22 off of the line of print just printed, so that the operator can determine whether the line of print is without error. The printing on the lines a, b, c, d, e, etc., appears to the operator in the order in which the printing was keyed in from the keyboard 38 and can be immediately read as the document exits the machine. Since printing is done as the document is moved in a single direction through the machine, the document may be of any reasonable length with a correspondingly great number of lines of print.

In the event that a document is accidentally dropped into the document exit slot (the vertical passage A) from the top of the machine, the document may be easily retrieved either by moving it upwardly out of the passage A or off of the substantially horizontal flat guide portion 30a if the document moves far enough and around the curved guide portion 30c. The guide portion 30a is located just above the keyboard 38, so the guide portion 30a is not only easily within reach for retrieval of documents but also is within easy reach for inserting documents into the machine or printing in the usual manner.

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CLAIMS

1. Operator controlled recording apparatus for recording matter on a discrete document entered into the apparatus by the operator and comprising a document transport path along which the document is transported within the apparatus, said apparatus being characterised in that the transport path comprises a document-receiving-and-guiding surface having an initial, externally accessible, entry, substantially horizontal, flat surface-portion on which the operator can position a document to be entered, followed by a contiguous upwardly directed, curved surface-portion which subtends an angle of substantially 90 degrees and changes the direction of movement of an entered document from a generally horizontal direction to a generally vertical direction.
2. Apparatus as claimed in claim 1, further characterised in that the horizontal surface-portion provides the lower wall of a document entry zone, a side of which is provided by a substantially vertical side wall forming an edge alignment surface for the document and the top of which is provided by a top wall inclined downwardly towards the lower wall so that the entry zone tapers and decreases in height towards the curved surface-portion.
3. Apparatus as claimed in claim 1 or 2, in which transport means are provided for transporting the document along the transport path beyond the curved surface-portion, further characterised in that the operator is required to slide or propel the document over the flat entry and contiguous curved surface-portions until at least the leading part of the document is engaged by the transport means and in that the

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document is not engaged by the transport means until the leading part thereof has passed substantially beyond the curved surface portion.

4. Apparatus as claimed in claim 1, 2 or 3, further characterised in that the document-receiving-and-guiding surface comprises a substantially vertical, flat, exit, surface-portion contiguous with the curved surface-portion and providing a guiding surface for the document as it exits from the apparatus.

5. Apparatus as claimed in claim 2 and 4, further characterised in that the top wall of the entry zone is contiguous with a slot wall extending within the machine generally parallel to the curved and exit surface-portions to define a document passage therewith.

6. Apparatus as claimed in claim 5, further characterised in that the transport means comprises one or more pairs of transport rolls projecting into the vertical portion of the document passage to grip a document therebetween and motor means for driving the rolls to propel the document upwardly.

7. Apparatus as claimed in claim 4, 5, or 6 in which the matter is recorded by printing and further characterised in that a platen projects through the vertical surface-portion at a location aligned with a printing mechanism.

8. Apparatus as claimed in any one of claims 1 to 7, further characterised in that the transport means are operative to increment the document line-by-line during recording and continuously to move the document at other times.

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9. Apparatus as claimed in claim 8, further characterised by the provision of document sensor means for sensing the position of the document in the transport path and for providing control signals to the transport means.

10. Apparatus as claimed in any one of claims 1 to 9, which apparatus further comprises a casing substantially enclosing the portion of the transport path beyond the entry surface-portion and in which the recorded matter can be visibly read, further characterised in that the casing is shaped and arranged and/or apertured so that the recorded matter is visible to the operator as or a short interval after it is recorded.

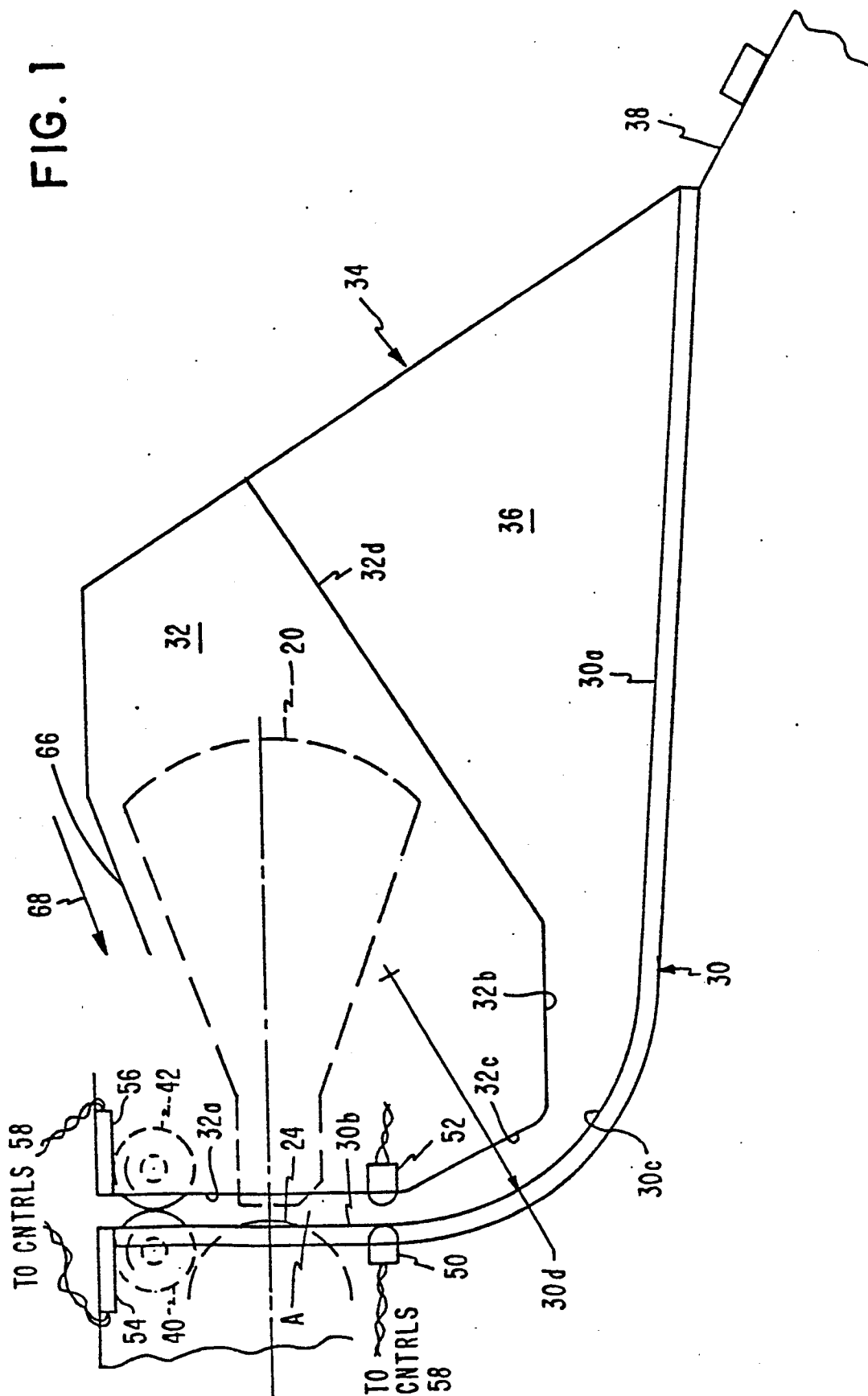
11. Apparatus as claimed in any one of claims 1 to 10, further characterised by the provision of a keyboard for keying in the matter to be recorded.

12. Printing mechanism for printing transverse lines of print on an elongate document including a document guide having an initial substantially horizontal flat guide portion, a curved guide portion connected therewith extending for substantially a right angle and a final flat vertical portion providing a vertical passage through which the document may exit upwardly whereby the document can be deposited on the initial guide portion and can be pushed through the guide to exit therefrom substantially vertically, and a printer traversing across said guide for printing lines of print on the document as it moves along said guide, said printer comprising a transport mechanism including a pair of opposite rolls in said passage, motor means for driving the rolls so that the rolls propel the document upwardly in said passage, first sensor means located at the bottom end of said vertical passage and

below said rolls for causing said motor means to continuously drive said rolls to propel the document upwardly in said passage and second said motor means to discontinue the continuous rotation of the rolls and to incrementally drive them when the document passes the second named sensor means whereby the printer may be effective to traverse across said guide to print a line between increments of said document.

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FIG. 1



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26

a — NOW IS THE TIME FOR ALL GOOD
b — IS THE TIME FOR ALL GOOD
c — THE TIME FOR ALL GOOD MEN
d — TIME FOR ALL GOOD MEN TO
e — FOR ALL GOOD MEN TO COME

FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 79 102 637.0

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>DE - B - 1 786 498 (KIENZLE)</u> * fig. 1 *	1,6-9	B 41 J 13/12

A	<u>DE - B2 - 2 619 620 (LANDIS & GYR)</u> * complete document *		

A	<u>US - A - 4 034 838 (UCHIDA)</u> * complete document *		

			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 41 J 11/38 B 41 J 13/00 G 07 F 7/04
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
☒ The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 07-11-1979	Examiner ZOPF