



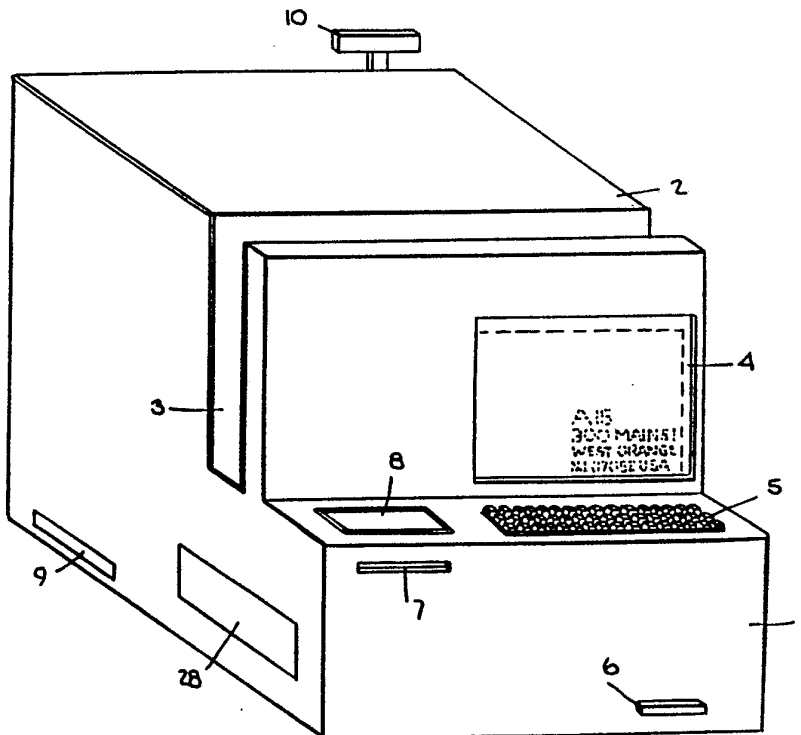
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US89/03293 (22) International Filing Date: 28 July 1989 (28.07.89) (30) Priority data: 226,777 1 August 1988 (01.08.88) US (71) Applicant: AUTOMATED IDENTIFICATION SYSTEMS, INC. [US/US]; 164 McKinley Avenue, East Hanover, NJ 07936 (US). (72) Inventor: PUSIC, Pavo ; 164 McKinley Avenue, East Hanover, NJ 07936 (US). (74) Agents: GRAY, Arthur, D. et al.; Kenyon & Kenyon, One Broadway, New York, NY 10004 (US).</p>		<p>(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent). Published <i>With international search report.</i></p>

(54) Title: AUTOMATED ELECTRONIC POSTAGE METER HAVING A DIRECT ACCESS BAR CODE PRINTER

(57) Abstract

The present invention discloses an automated electronically controlled postage meter including a mail weighing means, an alphanumeric keyboard (5), a direct access bar code thermal transfer printer, a magnetic and IC card reader/writer (6), a liquid crystal display (8, 10) and a double-station thermal and dot matrix printer (7). The configuration allows for the weighing of postcards, envelopes and packages. A magnetic and IC card reader/writer (6) is provided to allow for payment by debit, credit, or IC cards in addition to payment by cash or check. An alphanumeric keyboard (5) is provided to allow for the entry of alphanumeric data regarding the item to be mailed, which data is further converted and printed on the item to be mailed in the form of laser readable bar code. If direct printing is unsuitable, the bar code can be printed on a self-adhesive label to be stuck on the item to be mailed.



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AUTOMATED ELECTRONIC POSTAGE METER
HAVING A DIRECT ACCESS BAR CODE PRINTER

5 The present invention relates to postage meters and in particular to electronic postage meters having a microprocessor to control the printing of postage and the accounting therefor.

10 BACKGROUND OF THE INVENTION

Conventional postage meters have the ability to determine the weight of a mailing, calculate the postage charge by an electronic means, and print this charge on
15 the mailing. The payment for such a charge is then either debited from a previously charged memory or paid in cash to an employee who operates the machine in a postal office. It is generally known that these devices are used for the efficient and economical stamping of
20 postcards, letters, and packages but that they can not significantly improve the automation of the further sorting and tracking process because such mailings must go through an additional postage checking procedure. Even in the best of solutions, these mailings can be
25 sorted only by comparatively slow scanning procedures performed by photosensitive means with a comparatively low first read rate.

Generally known devices which have the ability to print

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horizontally oriented clocked code on a mailing significantly improve the sorting process but demand complicated handling because such a code must be precisely printed relative to an envelope's lower edge so that both the clock and information tracks line up with their appropriate reading head. Consequently, the location of the face of a mailing is particularly important and only single-pass scanning by photosensitive transducers is possible which makes the sorting process comparatively slow and uneconomical.

Hence, it is an object of the present invention to provide a device with the ability to weigh a mailing by electronic means and, based on its destination and other data entered on an alphanumerical keyboard, automatically print any required data in the form of laser readable bar code on the mailing or on a self-adhesive label to be stuck on the mailing for the purpose of enabling a completely automatic sorting and tracking process. When using any of the bar code types which are readable by a multi-pass laser scanning means installed on both sides of a mailing driving conveyor found in sorting hubs, an extremely fast and completely automatic sorting and tracking process with an almost perfect first read rate is achievable.

Considering the fact that some countries have an alphanumeric zip code and that a combination of two letters is the most suitable form of coding, either for a country code or a special request code, an alphanumeric type bar code is preferred for use with the present invention. By printing an alphanumeric bar code on a mailing, the present invention enables faster sorting and tracking of international mail traffic because this code allows one to choose a different two-letter code for each country and for a reasonable number of special requests while occupying very little space on

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the mailing itself.

Another object of the present invention is to provide a device which is able to accept payment by a variety of means including by cash or check paid to an employee, or by debit cards, various types of credit cards, or IC cards. In accordance with the present invention, all of these payment means can be used, thereby giving the invention a significant advantage, particularly in countries where the postal and telephone systems are owned by the same company and where, therefore, the postage can be debited from a pay-phone debit card or be automatically charged to a customer's telephone bill. When used in corporate mail rooms, in addition to printing a bar code on the outgoing mail, the present invention can be used for printing a bar code on the internal mail so that it too can be economically and automatically sorted.

20 SUMMARY OF THE INVENTION

An object of the present invention is to provide an electronically controlled postage meter which automatically prints the zip code, country code, special request code, and identification code directly on a postcard, letter, or package, referred to as "the" or "a" "mailing" in this text, in the form of laser readable bar code. The physical configuration of the present invention enables almost all mailings to be weighed and labeled by an automated electronic means but if this is unsuitable, a self-adhesive bar code label can be printed and manually stuck on a mailing.

In order to achieve the above object, the invention provides an electronic scale insertion slot and an electronic scale top surface mounted on an electronic weighing device, a mailing pressing unit also mounted on

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the weighing device, a thermal transfer printing head which has direct access to the mailing, an alphanumerical keyboard, a mailing dispensing mechanism, a liquid crystal display, and a double-station thermal
5 and dot matrix printer.

In accordance with the present invention, an inserted mailing is automatically weighed by an electronic means and after its destination is entered on a keyboard, a
10 charge is automatically calculated according to instructions from the machine's memory. The charge is then displayed both to the employee and to the customer and upon a confirmation that the charge has been paid, the mailing pressing, bar code printing, and mailing
15 dispensing procedures occur. According to individual requirements, the bar code printed on a mailing or on a self-adhesive label may comprise data about the mailing's destination zip code, the country of destination, and any special requests with any other
20 identification code which is required for the purpose of tracking a mailing with a particular special request.

Another object of the present invention is to provide a device able to accept different payment means. The
25 invention therefore provides a magnetic and IC card reader/writer for accepting payment by a debit card, various types of credit cards, or IC cards in addition to accepting payment by cash or check through an employee. In order to make the mail accepting procedure
30 as fast as possible, the machine also has the ability to perform a "follow on" procedure if the same customer wants to mail more than one item. The features and advantages of the present invention will become apparent from the following brief description of the drawings and
35 the detailed description of the invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

5 FIG. 1 is a perspective view of the machine housing showing the outside arrangement of its parts as disclosed by an embodiment of this invention;

10 FIG. 2 is the top view of the machine's thermal transfer printer configuration and the mailing pressing mechanism;

FIG. 3 is the front view of the machine's mailing pressing mechanism;

15 FIG. 4 is a perspective view from the back side of the machine showing the thermal transfer printer configuration located behind the insertion slot's rear wall and also showing the machine's electronic scale device;

20 FIG. 5 is the front view of the machine's electronic scale device and the mailing dispensing mechanism mounted thereon;

25 FIG. 6 is the left side view of the machine's scale configuration and its printing configuration and pressing mechanism wherein the pressing mechanism and scale configuration are mounted on the electronic scale device;

30 FIG. 7 is an example of the bar code to be printed on a mailing or on a self-adhesive label having a zip code and a country code printed in the first line, an identification code in the second line, and a special
35 request code in the third line;

FIG. 8 is a block diagram of the machine in accordance

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with the present invention;

FIGS. 9 to 11 are flow charts showing the process of the machine as disclosed by the present invention.

5

DETAILED DESCRIPTION OF THE INVENTION

Referring specifically to the drawings, FIG. 1 illustrates one embodiment of the present invention. With reference to FIG. 1 and in accordance with the invention, the machine housing 1 includes electronic scale top surface 2, electronic scale insertion slot 3, transparent glass window 4, a first alphanumeric keyboard 5, magnetic and IC card reader/writer 6, double-station thermal and dot matrix printer 7 and its paper and ribbon refilling opening 28, a first liquid crystal display 8, disc drive unit 9, a second liquid crystal display 10, and a second alphanumeric keyboard on the back of the machine and in front of the customer, which keyboard is not shown in the drawings.

As shown in FIGS. 2, 3, 4, 5, and 6, the housing 1 also includes a transparent mailing pressing panel 19, with its electromotor 17 and transmission mechanism 18, and a thermal transfer printing head 13 with its four lateral holders 12 on which two printing configuration carriers 11 are mounted for moving the configuration up and down. The carriers 11 are powered by stepping motor 15 also mounted on the configuration. Referring now to FIGS. 2 and 4, the configuration further comprises stepping motor 14 for moving the thermal transfer printing head 13 left and right over its supporting bars mounted on carriers 11.

As shown in FIGS. 5 and 6, the housing 1 further comprises an electronic scale device 16 on which insertion slot 3, top surface 2, mailing pressing

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- mechanism 17, 18, and 19, and mailing dispensing bar 21, which is powered by its solenoid 20, are all mounted in order to eliminate any outside influence while an inserted mailing is weighed thereon. The top surface
5 extends horizontally from the top border of the insertion slot's rear wall 31, as shown in FIGS. 1 and 6, and it can be used to weigh mailings unsuitable for being directly printed upon.
- 10 Referring again to FIG. 1, the double-station printer 7 comprise two printing heads. One printing head is of a dot matrix type used to print customer receipts or for totalling data for an employee upon the entry of specific instructions. The second printing head is of a
15 thermal type used to print data corresponding to the mailing destination in the form of laser readable bar code, as shown in FIG. 7, on a thermal sensitive self-adhesive label. The disc drive unit 9 built into the machine housing 1 is used for storing data about the
20 machine's status for later use in case the machine is installed as an independent unit. When the machine is connected to some external database, all corresponding data can be automatically transferred to such a database for further use. Magnetic and IC card reader/writer 6
25 built into the housing 1 is able to read and rewrite data on a debit card magnetic stripe and to read data from credit and IC cards for the purpose of accepting payment.
- 30 As shown in FIG. 7, the bar code to be printed directly on a mailing by the thermal transfer printing head 13 or on a thermal sensitive self-adhesive label by the thermal head in the double-station printer 7 comprises
35 previously entered and converted data about the mailing destination and, if required, any special request data and, consequently, an identification number. The bar code shown in FIG. 7 is an example of what should be

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printed on a mailing sent to zip code 75116 in France when an identification number is required and the postage is to be paid by a consignee (PC). The data shown in FIG. 7 can be arranged in a form most suitable
5 for scanning and later tracking purposes.

The machine disclosed herein further includes a control box, not shown in the drawings but schematized in FIG. 8, comprising a central processing unit (CPU) 22, a
10 sensor and switching unit 23, a communication unit 24, a temporary memory unit 25, a permanent memory unit 26, and a clock/calendar unit 27.

The machine disclosed by the present invention can be
15 used in a postal or a courier company's offices or in corporate mail rooms for the same purpose while utilizing a slightly different payment procedure. First, the procedure applied by a postal office or a courier company will be described.

20

The machine is to be operated by an employee who takes the mailing from a customer and, if the mailing is thinner than 1 inch, inserts it into scale insertion slot 3 or, if the mailing is thicker than 1 inch,
25 unsuitable for pressing, or made of material unsuitable for being printed upon, lays it down on the scale top surface 2. Referring now to FIG. 9, the electronic scale device 16 weighs the mailing and the weight data is loaded into the temporary memory unit 25. If the
30 mailing is inserted into insertion slot 3, its right edge has to be even with the insertion slot's right border so that the address written on the mailing can be read through the transparent glass window 4 as shown in FIG. 1. The right rear side of the mailing would then
35 be located in front of the printing window 32 as shown in FIGS. 3 and 4.

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The employee then reads the address on the mailing and manually enters the data regarding the mailing's zip code, country of destination, and any special requests on the machine's alphanumeric keyboard 5. Referring again to FIG. 9, the total postage charge is calculated based on the weight of the mailing, its destination, any special request data entered on the keyboard, and on any data stored in the machine's memory. The charge is then displayed, both on LCD 8 for the employee and on LCD 10 for the customer. Even if the mailing has to be weighed on top surface 2, the data entry, charge calculation, and display procedure is the same as the one described above.

As shown in FIG. 10, the calculated charge can be paid either in cash or check to the employee or by one of the following means:

- a previously bought debit card, wherein the company identification data and any credit amount are encoded on the card's magnetic stripe and debited upon each purchase.
- a valid customer credit card without a personal identification number (PIN);
- a valid customer credit card with a PIN;
- a valid customer IC card.

In countries where the postal system and telephone system operate as one, the debit card can be the same one which is used in the existing pay-phone system.

As shown in FIG. 10, if the payment is made by cash or check, the employee collects the charged amount and confirms the payment on keyboard 5 thereby enabling the machine to continue its process. If the payment is made by a debit card, the employee inserts the card into the machine's magnetic and IC card reader/writer 6 where the data about the card's validity and credit standing is read and then displayed on both LCDs 8 and 10. The

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calculated charge is then debited and a new balance is rewritten on the card's magnetic stripe for later use. If the existing credit is not sufficient to cover the postage charge, the card can be debited to zero and the remaining amount paid by a new debit card or in cash. After the charge is debited from the card and if a "follow on" instruction is not entered by the employee, a new balance is displayed and the card is returned. If the card proves to be invalid, a warning is displayed and the invalid card is automatically returned.

If payment is made by a credit card without a PIN, the card is inserted into the reader/writer 6 where its validity is checked and, if proven valid, the card number and the corresponding charge are loaded into the machine's memory to be stored or transferred to some external database for the purpose of later billing. If the card proves to be invalid, a warning is displayed and the card is automatically returned.

If payment is made by a credit card with a PIN or an IC card, the card is inserted into the reader/writer 6 and the customer gets two chances to enter the correct PIN on the small alphanumerical keyboard, not shown on the drawings, located in front of him and not seen by the employee. If the card proves to be valid and the correct PIN is entered, the machine's further procedure corresponds to the one described above.

Once payment is confirmed by the employee on keyboard 5 or by the card reader/writer 6, the machine's further procedure is performed according to the instructions entered by the employee on keyboard 5 and in accordance with one of the possible weighing scenarios.

As shown in FIG. 11, a mailing weighed inside scale insertion slot 3 is pressed to the slot's rear wall 31,

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firmly enough to allow for the accurate printing of the bar code, by the transparent pressing panel 19 which is moved forward by its electromotor 17 over its special transmission mechanism 18 which is shown in FIGS. 2, 3, and 6. The transmission mechanism 18 moves the pressing panel 19 toward the slot's rear wall 31 with a certain predetermined pressure and keeps the panel 19 stationary for as long as is required for the bar code printing process to take place. According to the process of the present invention, mailings of all sizes and up to 1 inch in thickness can be pressed with the pressure required to print the bar code in a satisfactory manner.

Simultaneously with the mailing pressing procedure, the previously entered destination and special requirement data is converted to a form of bar code, as shown in FIG. 7, and after the mailing is pressed and thereby secured, the thermal transfer printing head 13 is activated. The printing head 13 is located behind the slot's rear wall 31 and moves along the length and height of the printing window as shown in FIG. 4. The printing head 13 prints the bar code while moving from left to right, as observed from its position on the back of the machine, and it is powered by stepping motor 14. After the head 13 reaches the right printing margin, the entire configuration 11, 13, and 14 moves one step downwards over the four lateral holders 12 which are powered by stepping motor 15 and prints the next line by moving from right to left. This continues until the entire bar code is printed after which the printing head 13 returns to its starting position.

When using an alphanumeric type bar code, as shown in FIG. 7, any type of zip code, country code, and special requirement code can be printed, either in a high density horizontal position or, as preferred, in one bar code line under another while having the corresponding

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human readable characters printed under each line with the date of acceptance and postage paid printed in human readable characters in the bottom line. For mailings without a special request only one bar code line is
5 necessary to include the data on the zip code and the country of destination.

It is to be understood that any other data can be added or some of the shown data eliminated depending on
10 individual requirements and standards. It is also to be understood that any type of bar code and any type of combination can be applied even though alphanumeric Code-39 as shown appears to be the most suitable. Despite the reasonable assumption that the best results
15 in terms of bar code quality and corresponding costs can be obtained by using a thermal transfer printing head, it is to be understood that another printing means could be used for this purpose.

20 According to the process of the present invention and as shown in FIG. 11, as soon as the printing head 13 returns to its starting position, the pressing panel 19 turns backward to its starting position and the mailing is released. As shown in FIG. 5, solenoid 20 turns and
25 lifts the left side of the mailing dispensing bar 21, thereby allowing the mailing to slide out of insertion slot 3.

Referring again to FIG. 11, after the mailing is weighed
30 on scale top surface 2 and upon confirmation of payment and based on instructions from the keyboard, the thermal printing head inside the double-station printer 7 prints the bar code on a thermal sensitive self-adhesive label and dispenses it to the employee so that it can be
35 manually stuck on the mailing. The self-adhesive label includes the same data, printed according to the same principle as that previously described for direct on the

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mailing printing. During this type of printing procedure, the pressing panel 19, the thermal transfer printing head 13, and the dispensing bar 21 remain inactive. Furthermore, if any kind of special
5 requirement, such as a request for express or registered mail, is entered on the keyboard, the dot matrix printing head found in double-station printer 7 prints and dispenses a receipt for the customer.

10 The present invention can also be used in corporate mail rooms, either for outgoing or internal mail, where the destination data and special request data are printed in the form of a bar code by an identical procedure to the one described above but one including a slightly
15 different payment method. In this case, the payment has to be made either by a debit card issued by the corporate owner, which is permanently used until the encoded credit expires, or by a credit card where the data about the card and any corresponding charge is
20 stored or forwarded for the purpose of later billing. If payment is made by an IC card, which is yet another possibility, the charge can be accumulated in the machine's memory and, at the end of a working day, forwarded to be automatically debited from a customer's
25 bank account. Company employees could also use the machine for sending their own outgoing mail by paying the charge with a debit, credit, or IC card. The machine could also be used for printing a bar code on internal company mail to enable the sorting of such mail
30 through a "hub and spoke" system wherein a predetermined internal bar code could be identified by the system and where such a code would be printed free of charge.

It will be understood that the present invention has
35 been described in relation to a particular embodiment, herein chosen for the purpose of illustration, and that the claims are intended to cover all changes and

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modifications, apparent to those skilled in the art,
which do not constitute a departure from the scope and
spirit of the invention.

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What is claimed is:

1. Apparatus for processing an item to be mailed comprising:

computer means;

weighing means coupled to said computer means for weighing said item to be mailed;

data entry means coupled to said computer means for entering data relating to the item to be mailed, including the address to which said item is to be mailed;

determining means coupled to said computer means, to said weighing means, and to said data entry means for determining the required postage for said item to be mailed;

display means coupled to said computer means and to said determining means, said display means displaying the required postage for said item to be mailed;

payment means for accepting and verifying payment for said postage coupled to said computer means, to said display means, and to said determining means; and

means coupled to said computer means for providing machine readable information concerning the item to be mailed for the item to be mailed, including the zip code to which said item is to be mailed.

2. The apparatus according to Claim 1 wherein said data entry means include a first alphanumerical keyboard coupled to said computer means and to said determining means.

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3. The apparatus according to Claim 1 wherein said payment accepting and verifying means include:

means including a second alphanumerical keyboard coupled to said computer means for entering a personal identification number; and

means coupled to said computer means, to said display means, and to said determining means for detecting the presence of debit, credit, or IC cards, for reading said cards, for validating said cards, for charging said cards, and for returning said cards.

4. The apparatus according to Claim 1 wherein said information providing means includes:

means coupled to said computer means and to said data entry means for converting said data into laser readable bar code;

means for printing said laser readable bar code directly on the item to be mailed; and

means for printing said laser readable bar code on an adhesive label to be stuck on the item to be mailed.

5. The apparatus according to Claim 1 further comprising means coupled to said computer means for printing and dispensing human readable text detailing the transaction performed by said apparatus.

6. A method of processing mail comprising the steps of:

weighing the item to be mailed;

admitting data relating to the item to be mailed, said data including the address to which the item is to be mailed;

determining the required postage for the item to be mailed;

accepting and verifying payment for said postage; and

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providing machine readable information concerning the item to be mailed for the item to be mailed, including the zip code to which said item is to be mailed.

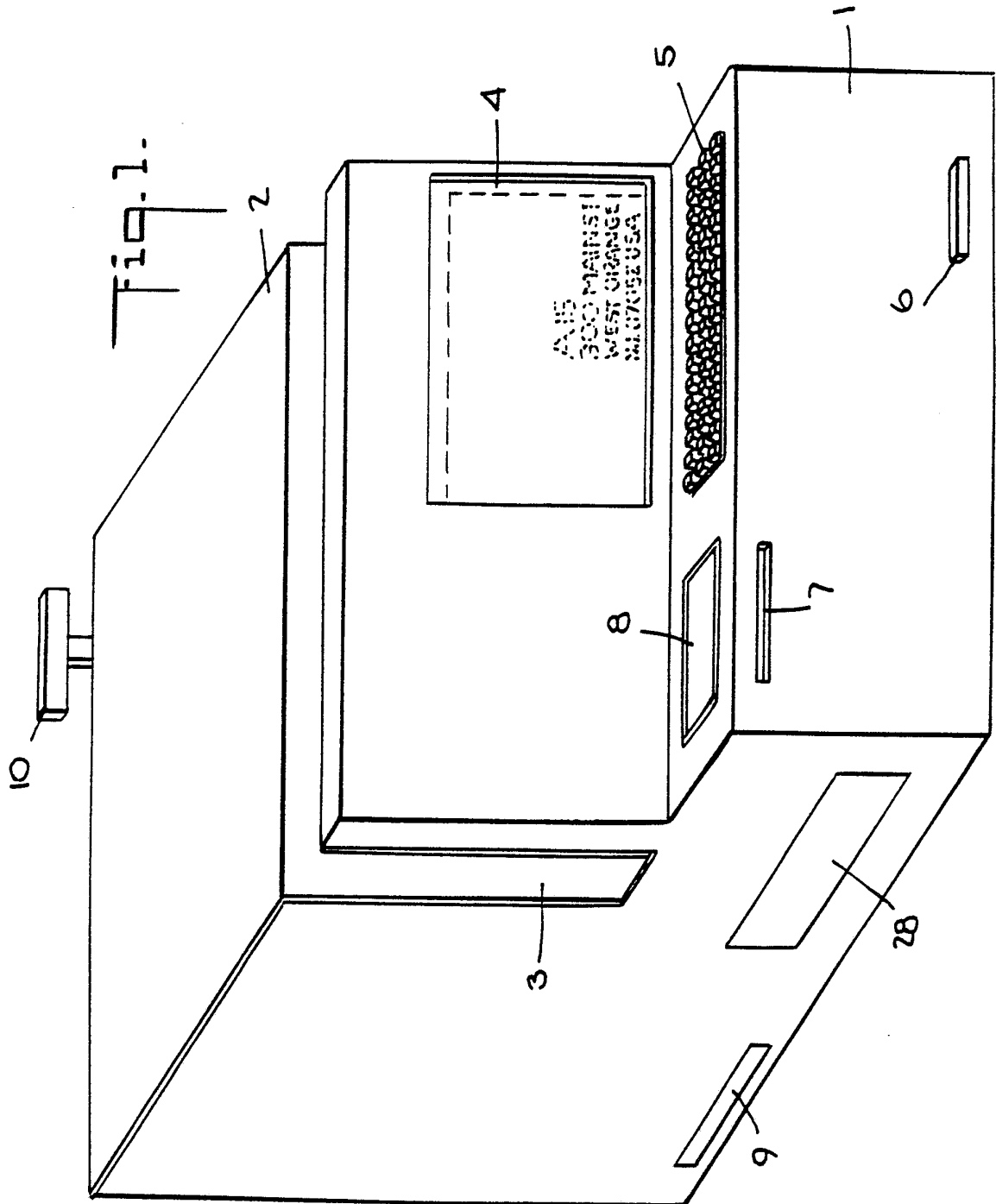


Fig. 2.

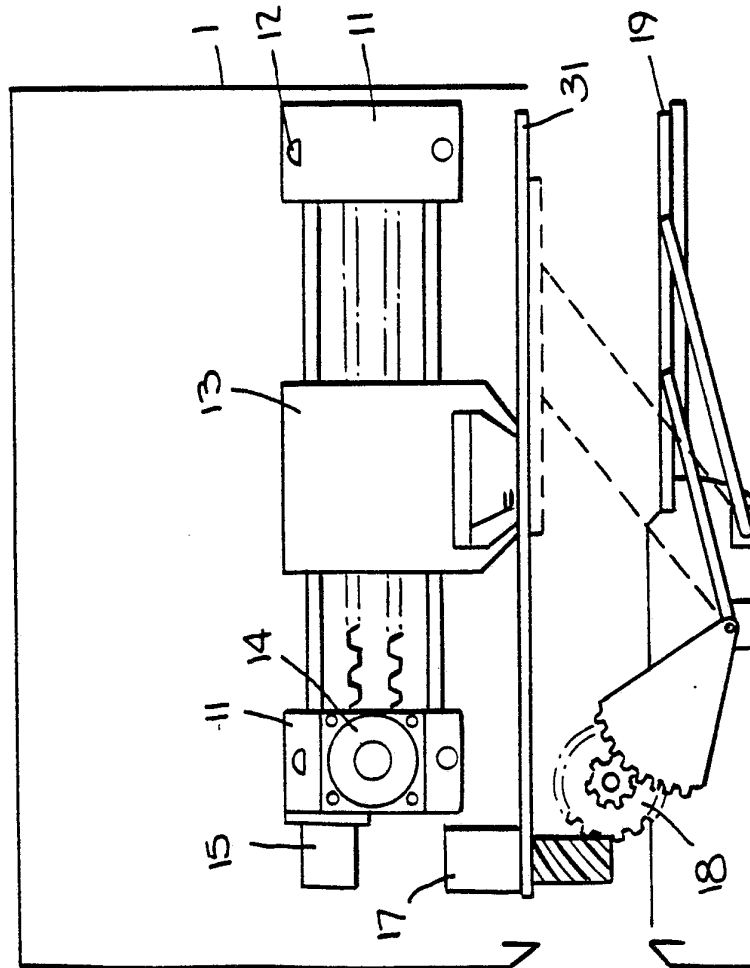
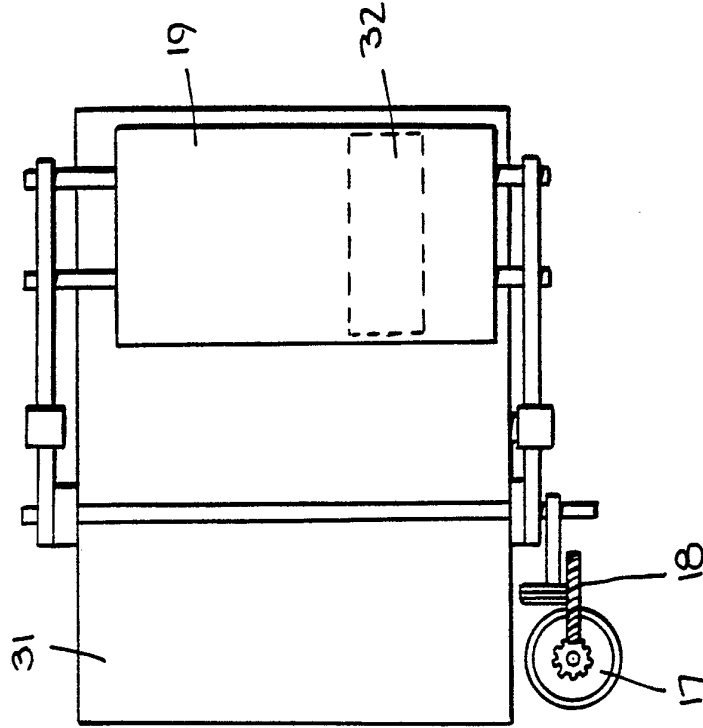


Fig. 3.



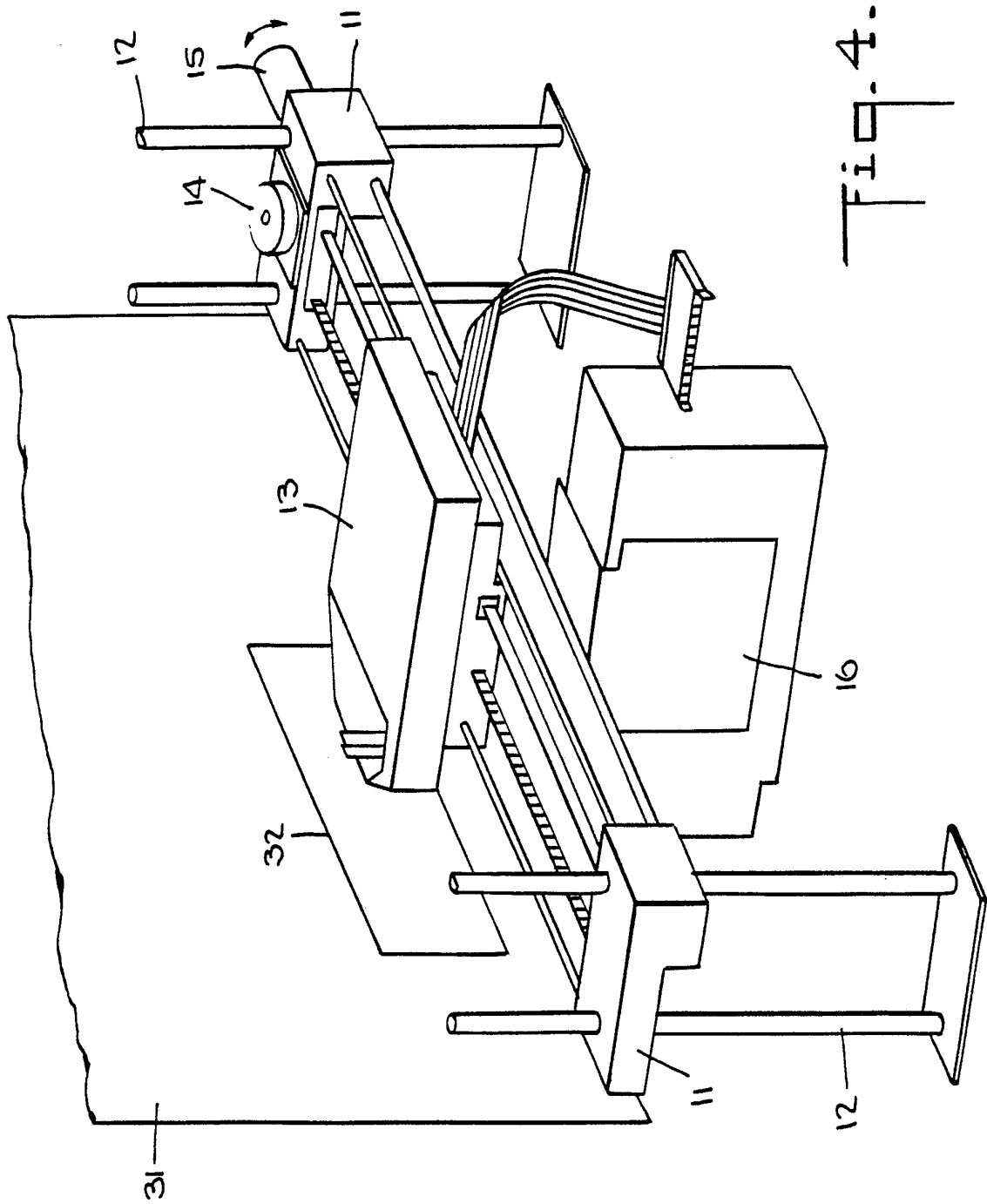


Fig. 4.

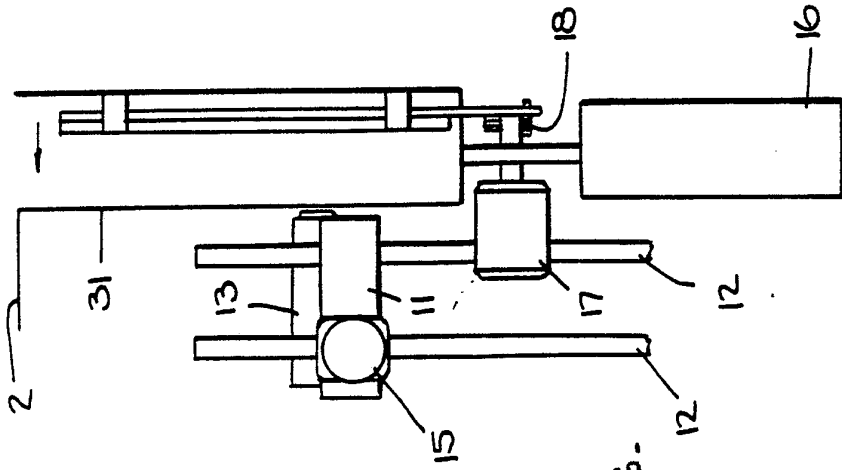


Fig. B.

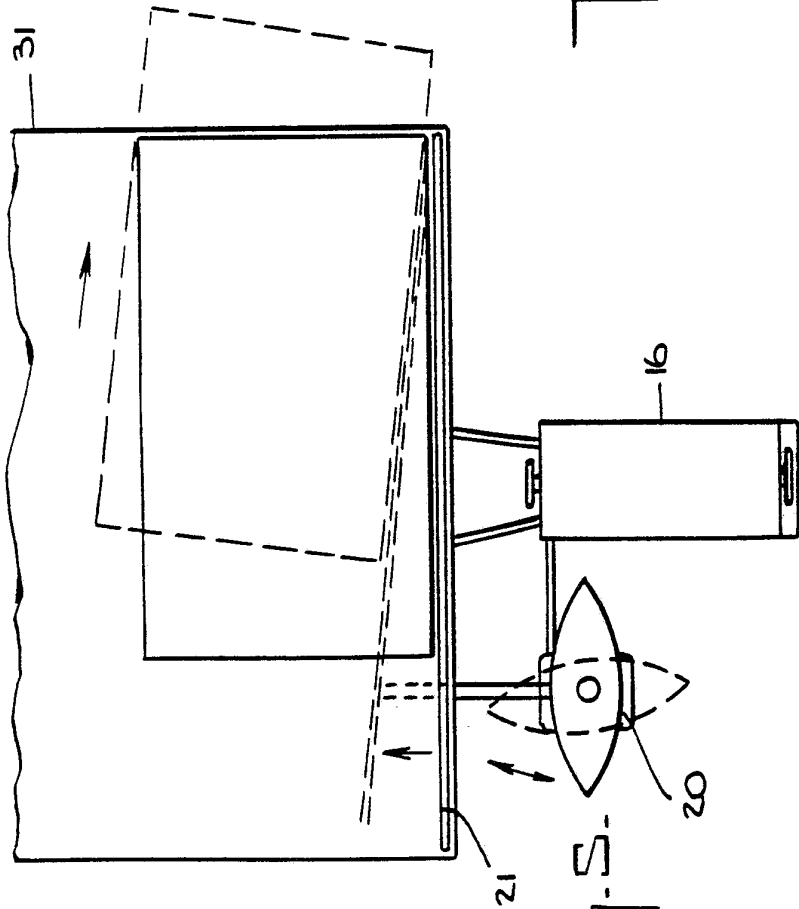


Fig. S.

Fig. Z.



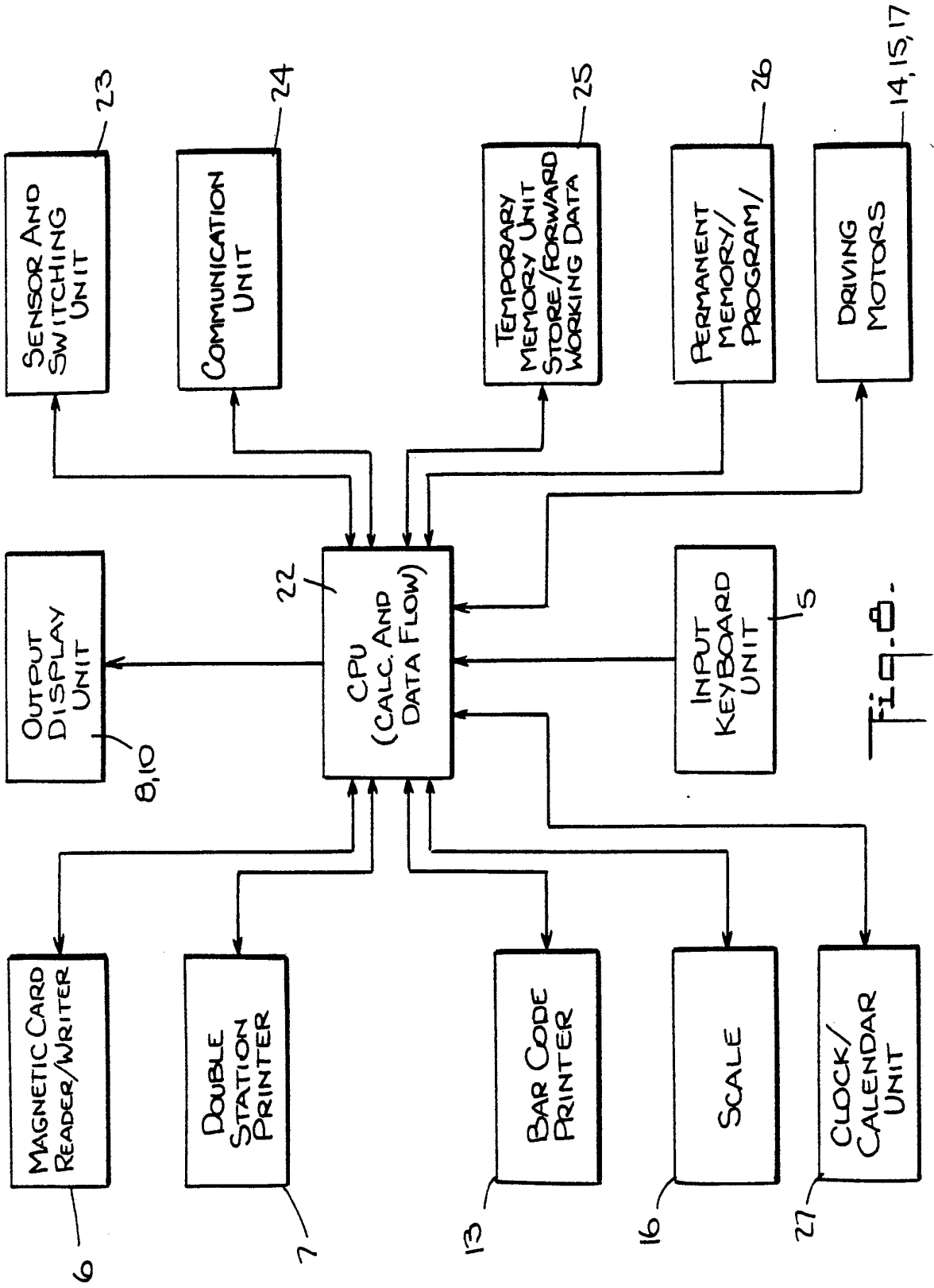


Fig. 9.

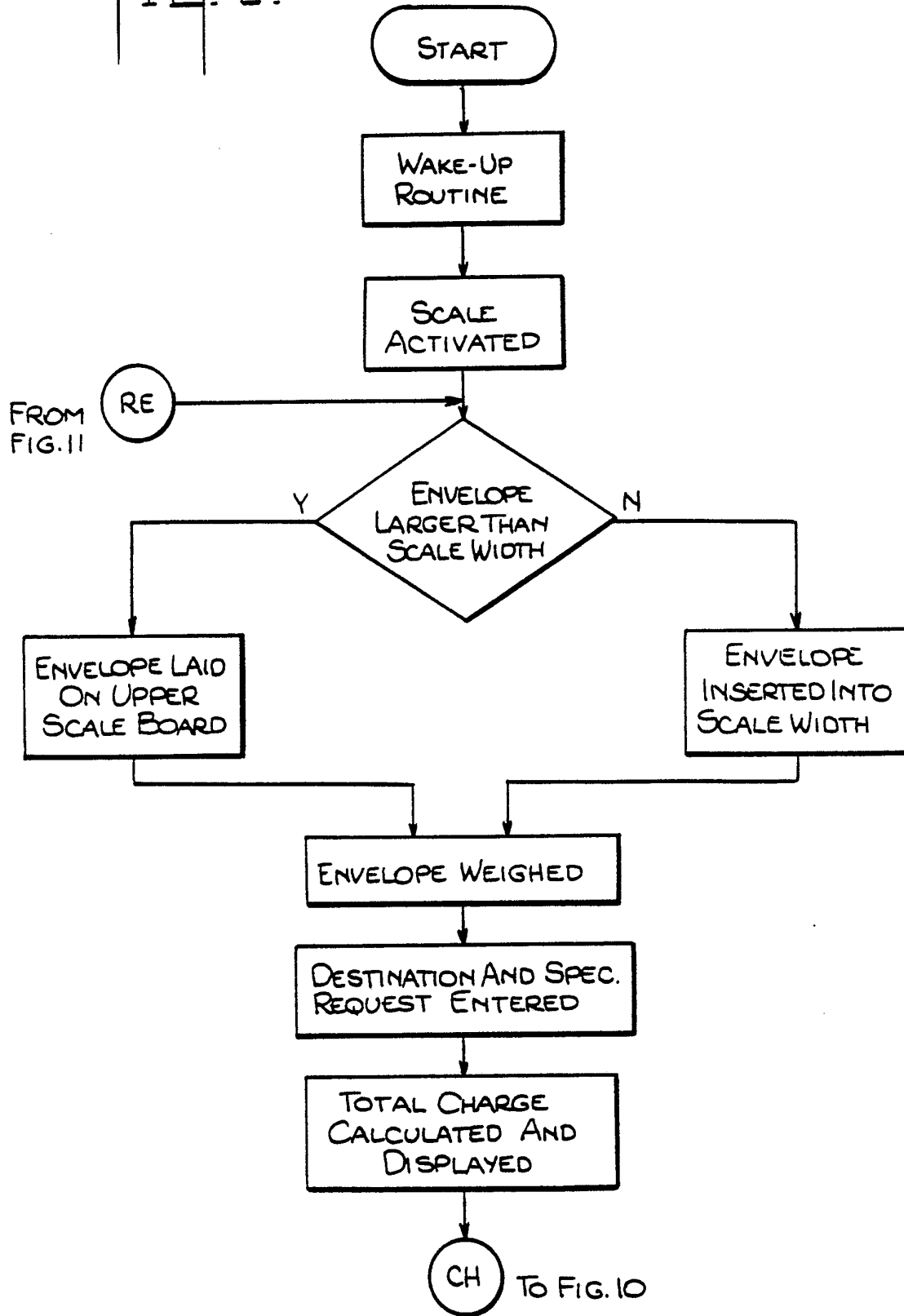
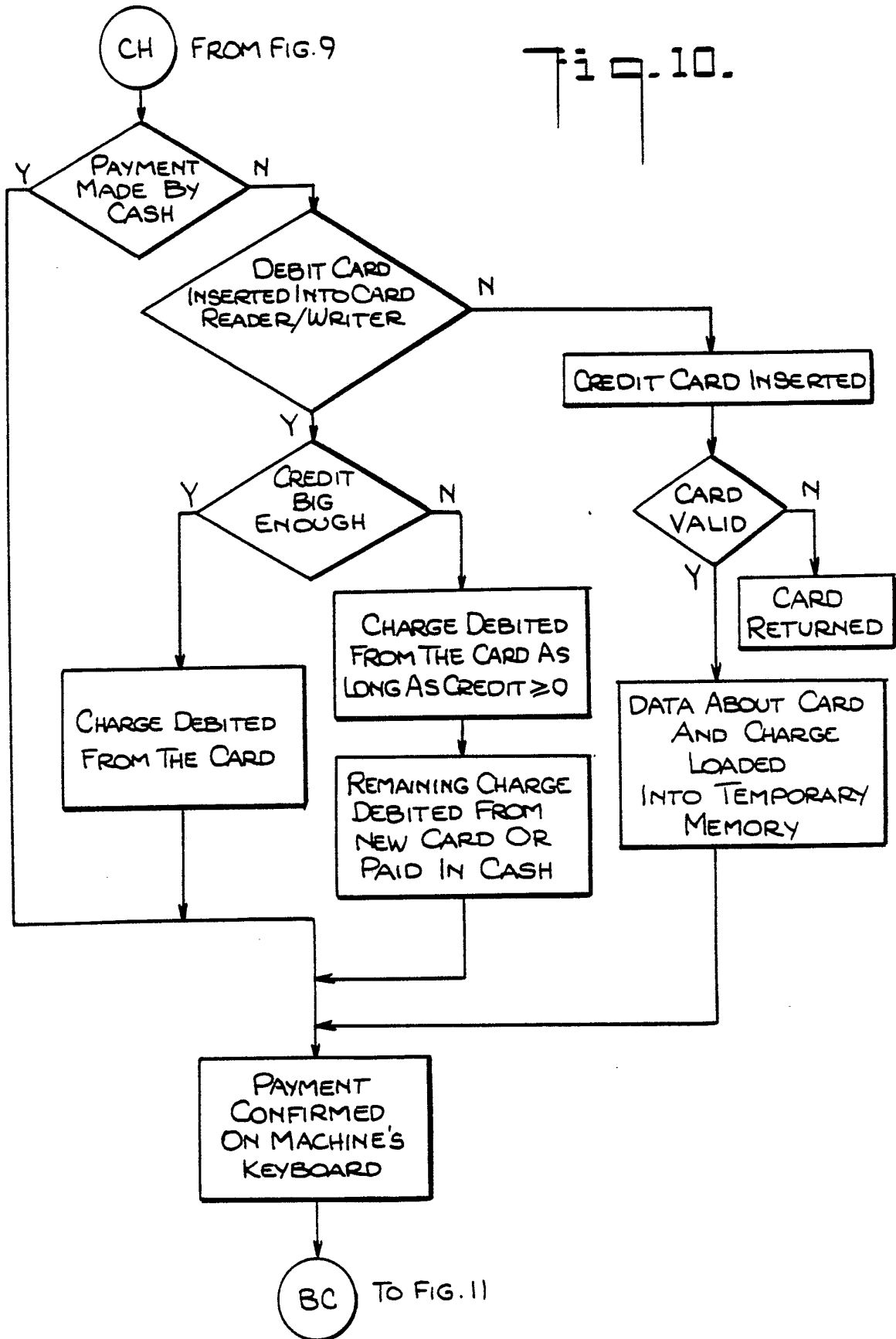


Fig. 10.



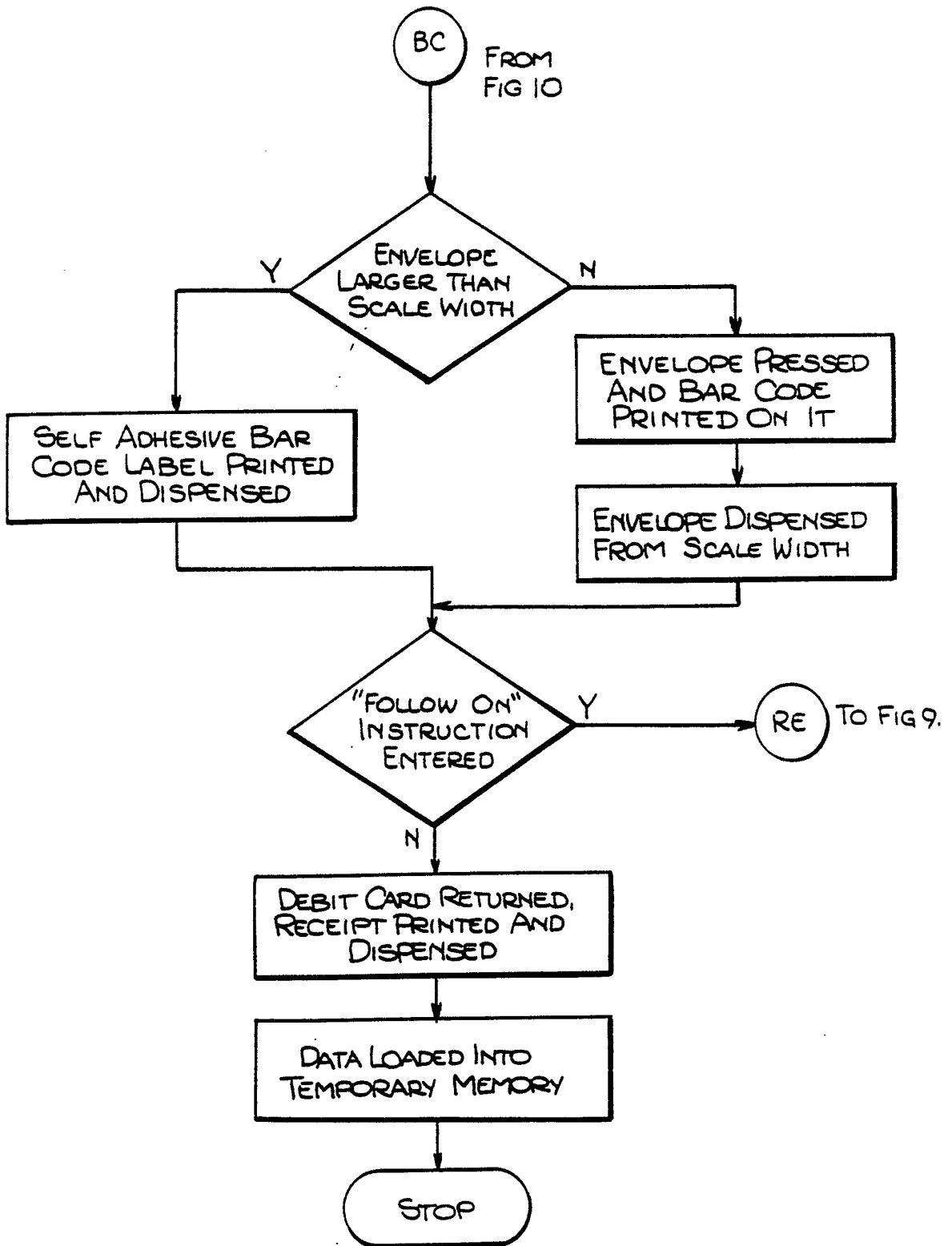
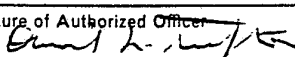


Fig. 11.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US89/03293

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC(4) G06F15/20 USCL 235/375		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
US	235/375; 364/464.02, 464.03	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X, P	US, A, 4,800,506 (AXELROD et al) 24 January 1989, See entire Document	1-6
X, P	US, A, 4,802,218 (WRIGHT) et al) 31 January 1989, See entire Document	1-6
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
17 OCTOBER 1989		02 NOV 1989
International Searching Authority		Signature of Authorized Officer
ISA/US		 DAVID L. TRAFTON