(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 493 949 A2**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **91311900.4**

(51) Int. Cl.5: **G07B 17/02**

(22) Date of filing: **20.12.91**

(30) Priority: **31.12.90 GB 9028225**

(43) Date of publication of application:
08.07.92 Bulletin 92/28

(84) Designated Contracting States:
CH DE FR GB LI

(71) Applicant: **ALCATEL BUSINESS SYSTEMS LIMITED**
P.O. Box 3 South Street
Romford Essex, RM1 2AR(GB)

(72) Inventor: **Gilham, Dennis Thomas**
12 Larkin Close
Brentwood, Essex CM13 2SL(GB)

(74) Representative: **Loughrey, Richard Vivian Patrick et al**
HUGHES CLARK & CO 114-118 Southampton Row
London WC1B 5AA(GB)

(54) **Postage meter.**

(57) A method of manufacturing and supplying to a user a fully operational postage meter (20) is disclosed in which the meter is rendered inoperative by setting of a secure flag in a storage location of non-volatile memory (14, 15) to which access is permitted only by use of a secure key. Provided the postal authority has permitted installation of the meter, a remote computer (18) is enabled to transmit to the meter a meter identification and an encrypted secure key. In an installation routine the meter checks that the received identification matches that of the meter and then proceeds to decrypt the secure key to obtain access to the storage location of the non-volatile memory to reset the key and thereby enable the meter for franking operations.

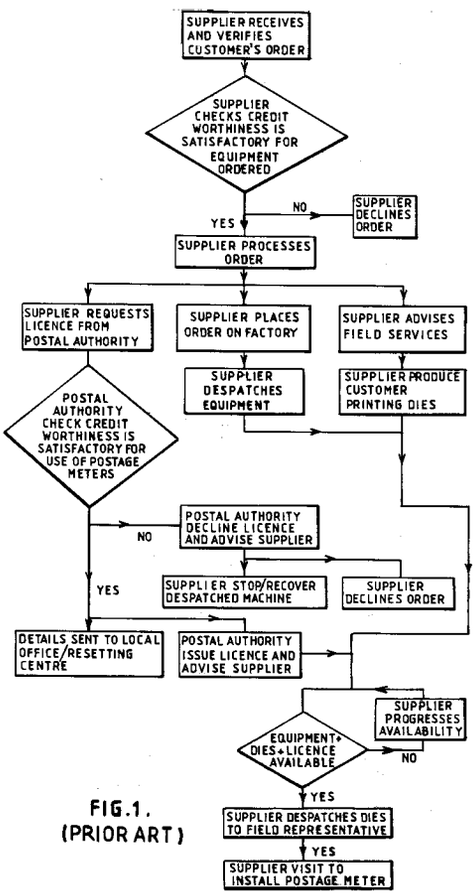

FIG.1.
(PRIOR ART)

EP 0 493 949 A2

This invention relates to postage meters and in particular to the installation of postage meters and initiation of such meters for use by a customer of a postal service.

Traditionally the installation of postage meters at a customer's premises has involved progressing through prolonged set procedures by the supplier of the postage meter, the customer who is to be the user of the meter and the postal authority. A typical procedural sequence is illustrated by the flow chart of Figure 1. After receipt of an order by the supplier of a postage meter from a customer, the supplier checks the credit status of the customer to ensure that it is satisfactory for the equipment ordered. If the credit status is not satisfactory, the supplier declines to accept the order. However if the credit status is satisfactory the supplier initiates a number of procedures to satisfy the order. One procedure is to place an order on the manufacturer or supplier of the postage meter for the supply and despatch of the equipment ordered. The meter despatched does not have dies for printing the franking impression installed in the meter so that at this stage the meter is unable to be used for franking mail items. Another procedure is to advise those responsible for service of the equipment in the field that the equipment is to be supplied to the customer and to order the supply of printing dies specifically for this customer. A further necessary procedure is for the supplier to request, from the postal authority, a licence permitting the customer to use the postage meter proposed to be supplied. In response to this request the postal authority checks that the credit status of the customer is satisfactory with regard to the postal authority's requirement in respect of use of postage meters. If the postal authority considers the credit status of the customer to be unsatisfactory, the postal authority declines to issue a licence and advises the supplier to this effect. Upon receipt of this advice from the postal authority the supplier stops despatch of the meter, recovers the meter from the customer or declines to supply the meter depending upon the time of receiving this advice in relation to the progressing of the supply of the meter. However if the postal authority considers the credit status of the customer to be satisfactory, the postal authority advises the local office of the authority and the centre which will be responsible for re-setting the meter with credit funding that a licence is to be issued to the customer. The postal authority likewise advises the supplier of the issue of the licence. When the equipment has been despatched and is on site at the premises of the customer and the dies are available and the licence has been issued, the dies are despatched to a representative of the supplier who then visits the customer's premises to install the dies on the meter to enable use of the meter by the customer.

It will be appreciated that these procedures are to be carried out by different organisations and need to be carefully coordinated in order to ensure that the delay between receipt of an order and the installation of a postage meter ready for use by the customer is not unduly long. Customers who are not acquainted with postage meters and the procedures for installing them for use are frequently confused and perplexed by the sequence of events. For this reason; the procedure for obtaining a licence is preferably initiated by the supplier who is familiar with the procedure and is better able to coordinate field service personnel with the supply of the equipment. Since the meter 15 despatched without the dies specific for that customer it cannot be used and hence despatch of the meter may be effected concurrently with the procedure requesting a licence thereby assisting in reducing the time taken for installation of the meter.

According to the invention a method of providing and installing a postage meter for use in franking mail items at a location, said postage meter including electronic circuits for carrying out accounting and control functions under the control of program routines and a printing device operable by said electronic circuits for printing franking impressions on mail items, is characterised during manufacturing of the postage meter by the steps of providing in the electronic circuits of the meter a non-volatile storage device storing a flag; said electronic circuits being inhibited from operating said printing device when said flag is set and being capable of operating said printing device to print franking impressions when the flag is un-set; unsetting of said set flag being effected only by entry to said electronic circuits of an electronic key;

storing a meter identification in said non-volatile storage device; and

setting said flag to inhibit operation of the electronic circuits from operating said printer to print franking impressions; and

after receipt of the postage meter by a user the steps of:-

entering said electronic key to said electronic circuits; and

operating the electronic circuits under the control of an installation routine to utilise the entered electronic key to access the flag and to unset the flag to enable the electronic circuits to be operated to carry out and control postage metering.

The invention will be described with reference by way of example to the drawings in which:-

Figure 2(a) is a flow chart of a simplified procedure for installation of a postage meter,

Figure 2(b) is a flow chart illustrating in more detail the installation routine of the postage meter,

Figure 3 is a block diagram of a postage meter, with an integral printing device, in communication with a remote computer, and

Figure 4 is a block diagram of a postage meter and separate printing device controlled by the meter.

In a simplified procedure illustrated by the flow chart of Figure 2(a), the supplier of the postage meter undertakes the licensing procedure and the postage meter is despatched complete with printing dies to the customer. As may be seen from Figure 2, upon receipt of an order the supplier checks the credit status of the customer not only in respect of payment for the supply of the equipment but also in respect of payment to the postal authority for value of postage to be used in operation of the meter. If the credit status check is not satisfactory in both respects, the supplier declines to accept the order. On the other hand if the credit check is satisfactory in both respects the supplier initiates the processing of the simplified procedures to meet the order. The supplier places an order for supply of the equipment on the supplier's factory and advises the field service representative that the equipment is to be supplied. In addition the supplier issues a licence in respect of the equipment for the customer and transmits on line to the postal authority computer data containing details of the customer and meter identification. It will be appreciated that to prevent unauthorised and possibly fraudulent transmission of much data to the postal authority computer, the data is transmitted in a secure manner for example by encryption and the inclusion of a secure code in the transmitted data. The data transmission protocol includes data checking and re-transmission of the data in the event of error or transmission failure. Upon successful receipt of `he data the postal authority computer returns an acknowledgement signal to the supplier. Usually the transmission of this data will be to a central postal authority computer and the postal authority will then disseminate the data to a local postal authority office and a resetting centre as required.

The supplier despatches the postage meter complete with dies. The secure housing of the meter, containing the accounting circuits and other elements required to be protected, is sealed with security seals to prevent unauthorised tampering. The meter is despatched with all documents required for instruction of a customer in the installation and use of the meter. Accordingly the customer receives the meter ready to be powered and used. However as will be described hereinafter, a licence flag is set to prevent use of the meter for franking operations.

Referring now to Figure 3, the postage meter comprises a microprocessor 10 operable under program routines stored in a read only memory (ROM) 11 to carry out accounting and control functions in the meter. A keyboard 12 is provided to enable a user to input data and control signals to the microprocessor and a display device 13 displays information to assist the user in use of the meter. Non-volatile memory devices 14, 15 are provided for storage of accounting data and a random access memory 16 is provided as a working store for the microprocessor. The non-volatile memory devices 14, 15 provide a descending register for storing a value of credit available for use in franking, an ascending register for storing an accumulated value of postage used, and registers for an items count of the number of franking impressions printed and a high items count of the number of items franked with a value above a predetermined value. As is well known in the postage meter art, the registers are replicated in each of the memory devices 14; 15 in order to maintain integrity of the accounting data in the event of a fault. The meter includes a printing device 17 which may be a print drum with print wheels settable by operation of the microprocessor for printing franking impressions including selected values of postage. Communication with a remote device such as a computer 18 is enabled by means of an input/output connector 19 in the wall of the secure housing 20 of the meter which is connected to the microprocessor via an input/output interface 21. During manufacture of the postage meter, a meter identification code, which may a licence number, is written into the non-volatile memory 14, 15 and a licence flag is set in a storage location of the non-volatile memory. Access to the storage location storing the licence flag is protected by a secure electronic key. When the licence flag is set, the meter is disabled and cannot be used although information can be displayed on the display device. Thus while the licence flag is set the meter cannot be used for franking mail items and credit cannot be entered in the descending credit register. The flag can be unset only by receipt of the secure electronic key which permits access to the storage location containing the flag.

It is to be understood that protection of access to the storage location containing the licence key prevents the key being unset except when the secure electronic key is utilised to access the storage location. However, the storage location can be accessed to determine the state of the flag without the use of the secure key. Thus when a user attempts to use the postage meter for franking operations, the microprocessor first determines the state of the flag and if the flag is set the microprocessor terminates operation of the meter and returns to a standby mode. However if the flag is determined to be in the unset state, the microprocessor proceeds with program routines for carrying

out a franking operation.

When the postal authority computer has acknowledged receipt of data relating to the customer and the postage meter, the meter can be installed at the customer's premises by the customer as soon as it is received by the customer. Communication is established between the postage meter and the supplier's computer 18. This is achieved by connecting the input/output connector 19 via a modem 22 to the telephone communications network 23. This may be initiated by the customer dialling the telephone number of the supplier's computer or may be initiated by a service representative. The supplier's computer checks that communication has been established with the meter and transmits a message or sequence of messages to unset the meter licence flag to enable the meter for normal use. The meter installation routine is illustrated by the flow chart of Figure 2(b). The transmission from the supplier's computer contains an application code relating to meter installation and meter identification in unprotected format together with a secure data block containing the secure key. The key is encrypted using a non-linear algorithm containing, for example, a random number table. The algorithm is unique to the supplier and installation procedure. A different algorithm is used in respect of other remote services such as credit re-setting by postal authorities.

Upon receipt of the application code from the computer, the microprocessor enters an installation routine and checks the received meter identification with an identification stored in the memory of the meter. If the result of the check is positive the microprocessor decrypts the secure data block containing the secure electronic key. This key Is compared with an electronic key stored in the meter and if the comparison is successful the microprocessor is enabled to access the storage location containing the flag and thence to unset the licence flag. Upon the licence flag being unset the meter is then in a condition to permit normal usage of the meter for franking and for resetting of credit value in the descending register. If either the meter identification check or the comparison of the electronic key is unsuccessful, the installation routine is terminated and may be re-initiated. After a predetermined number of attempts at installation have failed, the installation routine is inhibited and cannot be re-initiated until the equipment has been examined by a service representative.

In the event of a communication failure between the meter and the supplier's computer or failure to unset the licence flag, the installation procedure and the communication link is terminated. After a predetermined interval the installation procedure is re-initiated. If the second attempt to install the meter fails, a visit is made by the service representative to the customer's premises to check the equipment.

If desired, the customer may enter a key sequence on the keyboard of the meter prior to connecting the meter on-line to the supplier's computer. This entered key sequence instructs the microprocessor to display prompts on the display device to assist the customer in carrying out any operations required for installation of the meter particularly if the first initiated communication and installation procedure should fail. Instead of installing the meter by means of remote communication with the supplier's computer, the installation may be accomplished by the customer keying in manually a secure code on the keyboard of the meter. This secure code would contain the secure electronic key to unset the licence flag and the customer may additionally be required to key in data identifying the meter. The secure code keyed in manually may be a truncated section of the secure code which would be transmitted direct to the meter over the telephone network by the supplier's computer. The installation procedure would be inhibited after a predetermined number of attempts in which codes not recognised by the meter are entered.

Transmission protocols for the secure transmission of data are described in our European patent application No. 89313220.9. These protocols may be used for the secure transmission of data in the installation procedure described hereinbefore.

While hereinbefore, the postage meter has been described as having a printing device such as a print drum requiring printing dies to print the fixed invariable portions of the franking impression, it is to be understood that other printing devices may be used. Instead of a print drum carrying printing dies and having settable print wheels for printing variable information such as the postage amount and the date of franking, a digital printing device may be used. Typically such printing devices print dots in selected positions along a row in a succession of printing cycles whereby the fixed and variable data is printed row by row to build up a complete franking impression as the mail item is fed past the printing device.

The non-volatile memory devices 14, 15 of the meter for storing accounting data, meter identification and the licence flag may be volatile random access memory devices powered by long life battery to ensure that data stored therein is retained even when the meter is not powered or the memory devices may be non-volatile devices such as E^2PROM which retain data even in the absence of power.

Hereinbefore, the printing device 17 of the postage meter has been described as a print drum with print wheels settable for printing franking im-

pressions with selected values of postage. Such print drums carry one or more printing dies on the peripheral surface thereof which print invariable portions of the franking impression as determined by the postal authority and a logo or other material as may be required by the user of the postage meter. The drum printing devices are manufactured as an integral part of the postage meter.

Instead of using a drum printing device for printing the impression, other types of printing device may be used. Such printing devices include dot matrix printers in which a line of printing elements are operated selectively to print dots in selected positions in a line and are repetitively and selectively operated to build up the required impression line by line. Printing devices operating in this manner include thermal, ink jet or optical printing devices. Instead of a line of printing elements, the ink jet and optical printing devices may utilise a single element and a scanning system to traverse an ink trajectory or optical beam across an area in which printing is to be effected.

In some configurations of franking machine, as illustrated by Figure 4, it may be desired to house the printing device 17 separately from the postage meter which enables the printing device to be positioned at a location convenient for handling mail items while the postage meter is located at a different location which is convenient for operation thereof and does not interfere with or impede the handling of the mail items. When this is desired the printing device 17 is controlled remotely by the postage meter and is coupled to the meter either by electric cable 24 or by signals transmitted by radiation.

Claims

1. A method of providing and installing a postage meter for use in franking mail items at a location, said postage meter (20) including electronic circuits (10) for carrying out accounting and control functions under the control of program routines (11) and a printing device (17) operable by said electronic circuits for printing franking impressions on mail items, characterised during manufacturing of the postage meter by the steps of :-
providing in the electronic circuits (10) of the meter (20) a non-volatile storage device (14, 15) storing a flag; said electronic circuits (10) being inhibited from operating said printing device (17) when said flag is set and being capable of operating said printing device to print franking impressions when the flag is unset; un-setting of said set flag being effected only by entry to said electronic circuits of an electronic key; storing a meter identification in said non-volatile storage device (14, 15); and
setting said flag to inhibit operation of the electronic circuits (10) from operating said printer (17) to print franking impressions; and
after receipt of the postage meter (20) by a user the steps of:-
entering said electronic key to said electronic circuits (20); and
operating the electronic circuits (20) under the control of an installation routine (11) to utilise the entered electronic key to access the flag and to unset the flag to enable the electronic circuits to be operated to carry out and control postage metering.

2. A method as claimed in claim 1 further characterised after receipt of the postage meter by the user the steps of entering a meter identification signal and comparing said meter identification signal with said stored meter identification and only in response to the identification corresponding to the identification signals continuing with the step of utilising the electronic key to access the flag.

3. A method as claimed in claim 1 or 2 further characterised in that the electronic key is entered in the postage meter in a secure data block and the electronic circuits (20) are operable to retrieve the key from the data block.

4. A method as claimed in any preceding claim further characterised in that after receipt of the postage meter (10) by the user the meter is connected to a remote computer (18) via a communication link (23) and the meter identification signal and electronic key are transmitted by the computer to the postage meter.

5. A method as claimed in any preceding claim further characterised in that the printing device (17) is supplied as an integral part of the postage meter (20).

6. A method as claimed in any one of claims 1 to 4 further characterised in that the printing device (17) is supplied as a unit separate from the postage meter (20) and is controllable remotely by the electronic circuits (10) of the postage meter to print franking impressions.

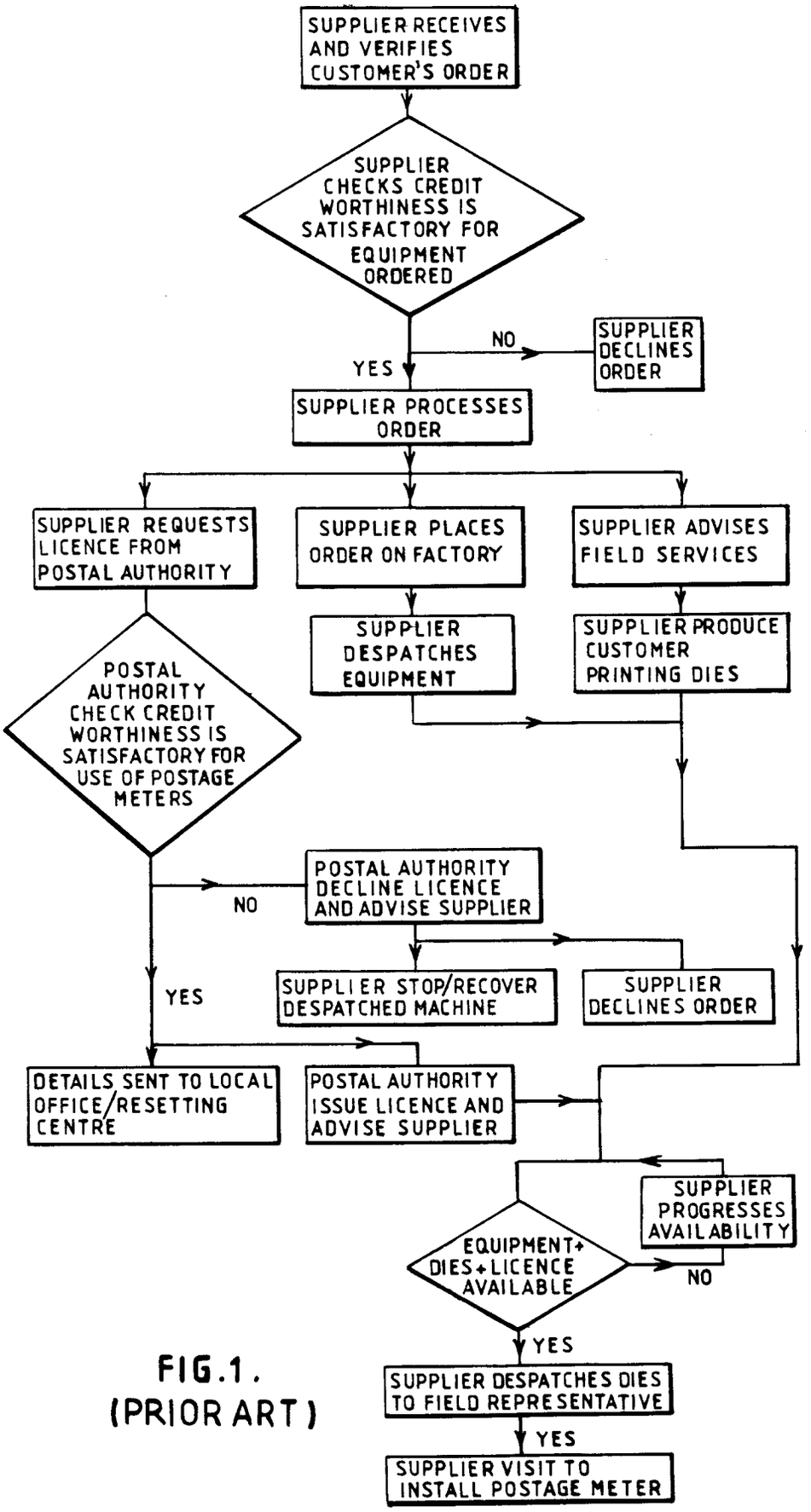

FIG.1.
(PRIOR ART)

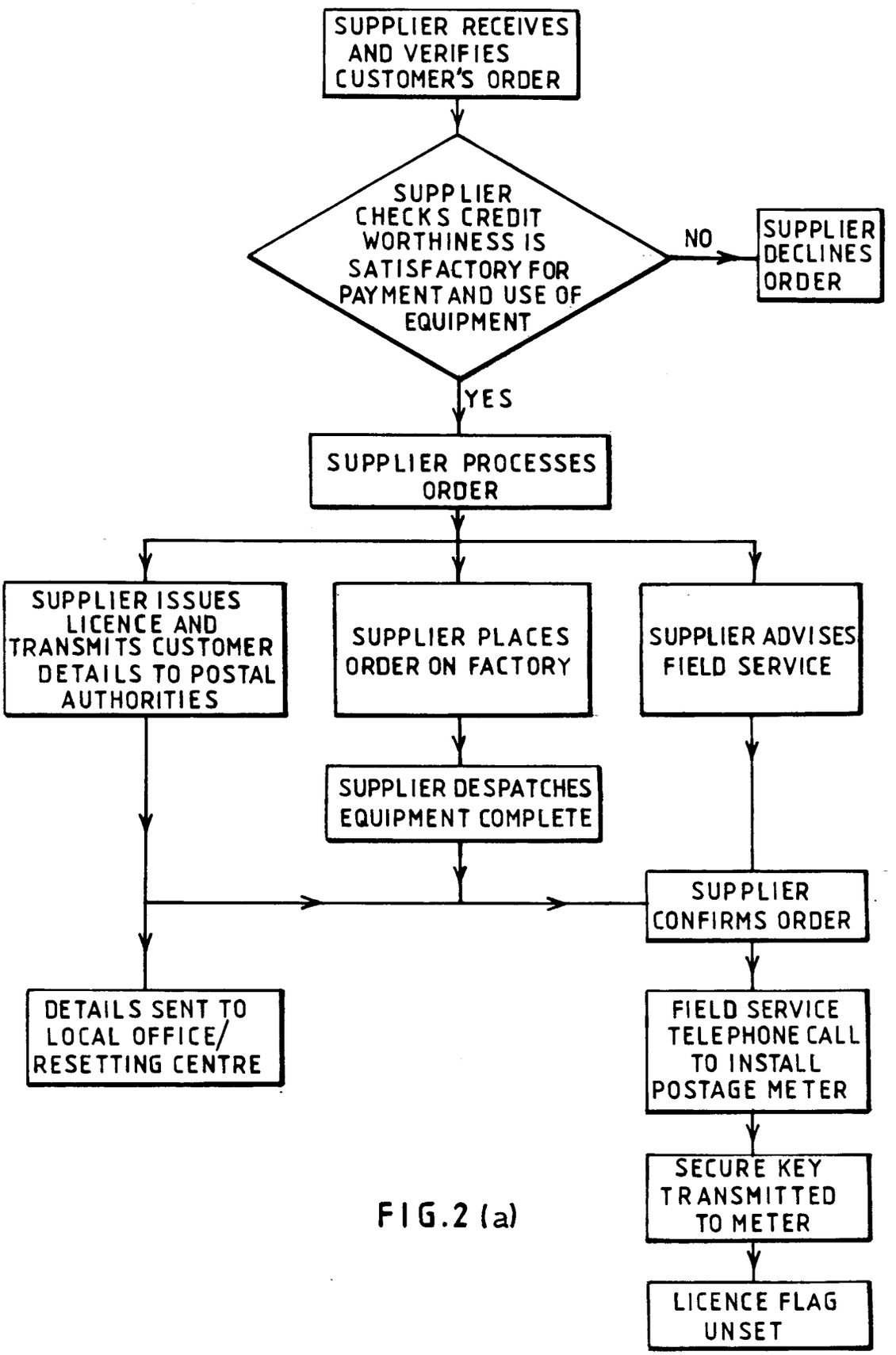
SUPPLIER RECEIVES AND VERIFIES CUSTOMER'S ORDER
SUPPLIER CHECKS CREDIT WORTHINESS IS SATISFACTORY FOR PAYMENT AND USE OF EQUIPMENT
NO
SUPPLIER DECLINES ORDER
YES
SUPPLIER PROCESSES ORDER
SUPPLIER ISSUES LICENCE AND TRANSMITS CUSTOMER DETAILS TO POSTAL AUTHORITIES
SUPPLIER PLACES ORDER ON FACTORY
SUPPLIER ADVISES FIELD SERVICE
SUPPLIER DESPATCHES EQUIPMENT COMPLETE
SUPPLIER CONFIRMS ORDER
DETAILS SENT TO LOCAL OFFICE/ RESETTING CENTRE
FIELD SERVICE TELEPHONE CALL TO INSTALL POSTAGE METER
SECURE KEY TRANSMITTED TO METER
LICENCE FLAG UNSET

FIG.2 (a)

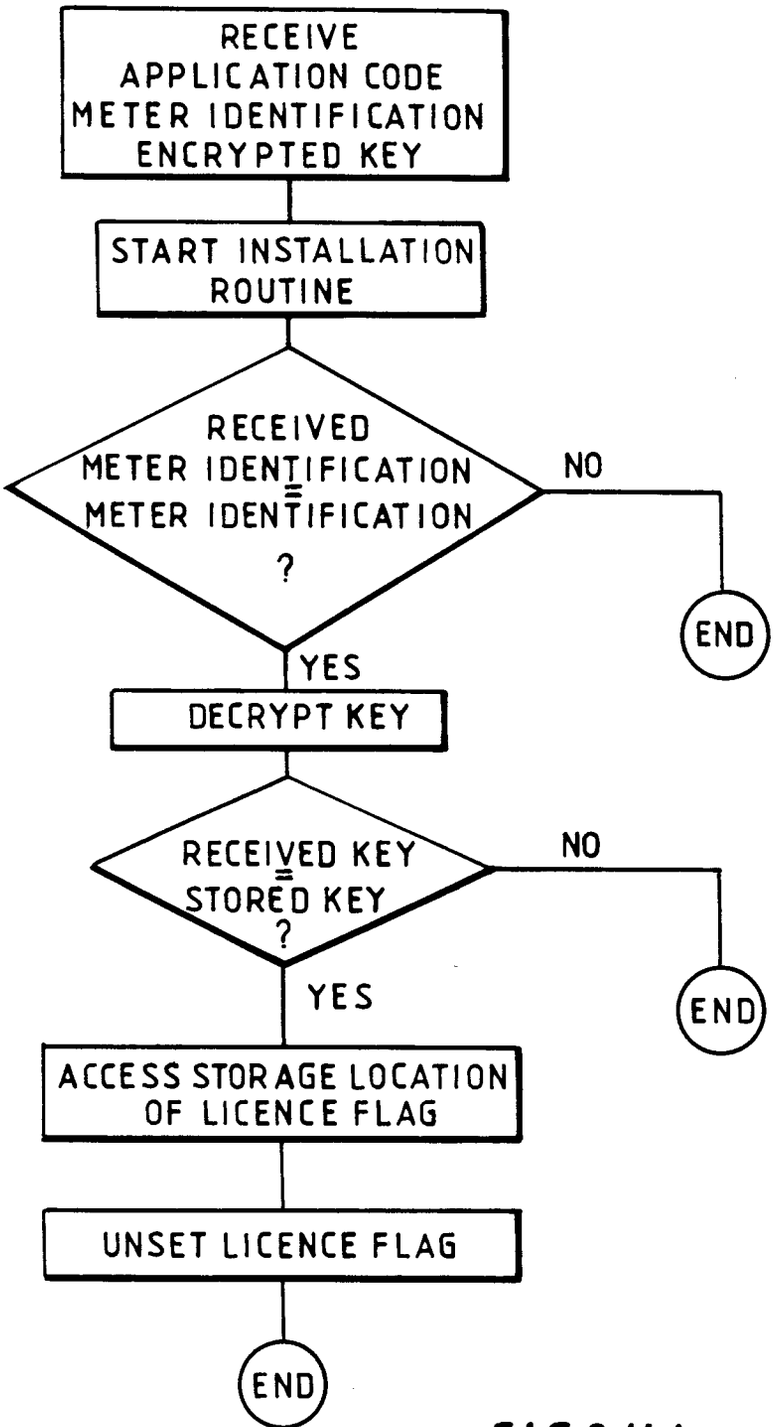
RECEIVE
APPLICATION CODE
METER IDENTIFICATION
ENCRYPTED KEY
START INSTALLATION ROUTINE
RECEIVED METER IDENTIFICATION = METER IDENTIFICATION ?
NO
END
YES
DECRYPT KEY
RECEIVED KEY = STORED KEY ?
NO
END
YES
ACCESS STORAGE LOCATION OF LICENCE FLAG
UNSET LICENCE FLAG
END

FIG 2 (b)

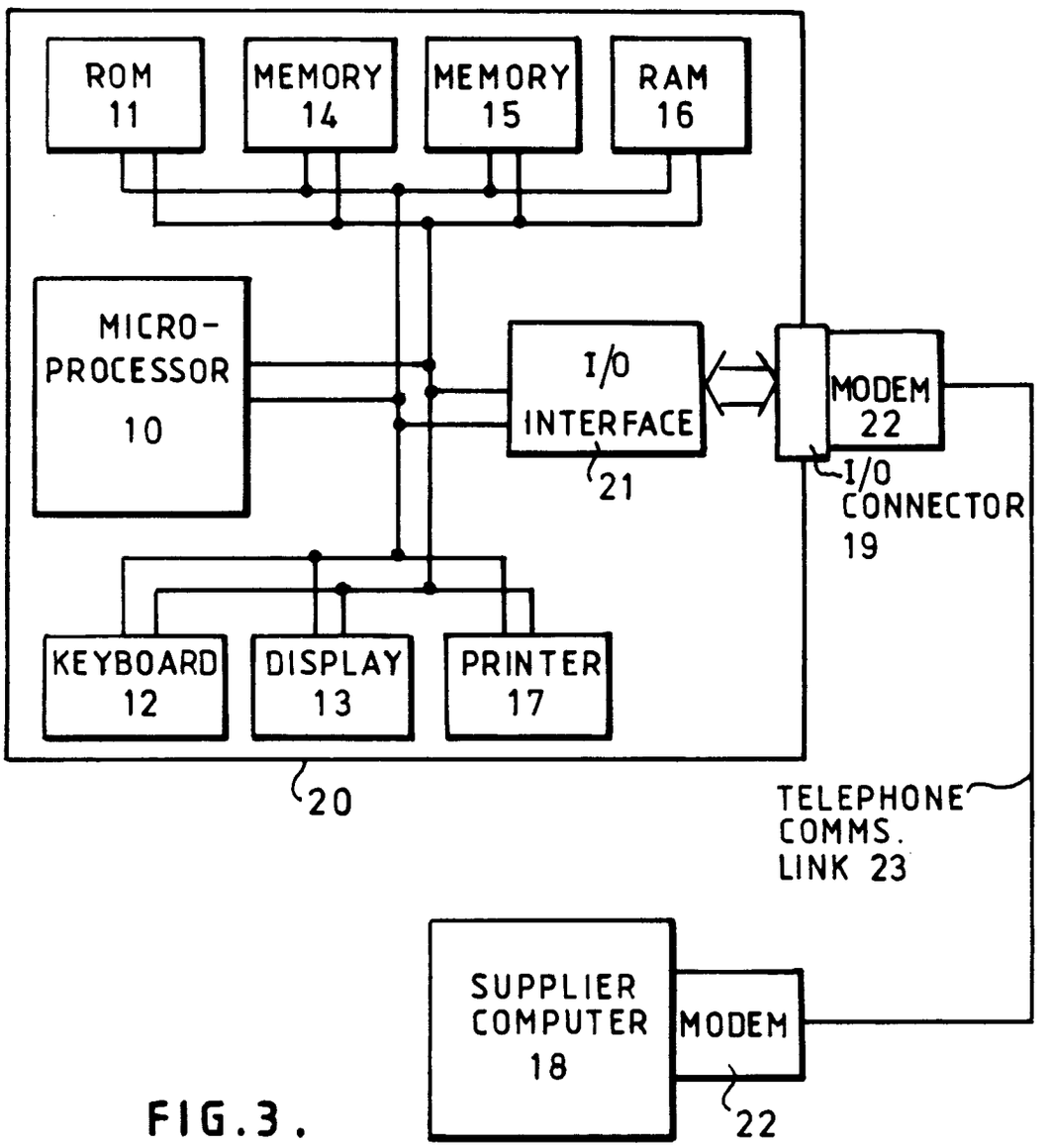
ROM
11
MEMORY
14
MEMORY
15
RAM
16
MICRO-
PROCESSOR
10
I/O
INTERFACE
21
MODEM
22
I/O
CONNECTOR
19
KEYBOARD
12
DISPLAY
13
PRINTER
17
20
TELEPHONE
COMMS.
LINK 23
SUPPLIER
COMPUTER
18
MODEM
22

FIG.3.

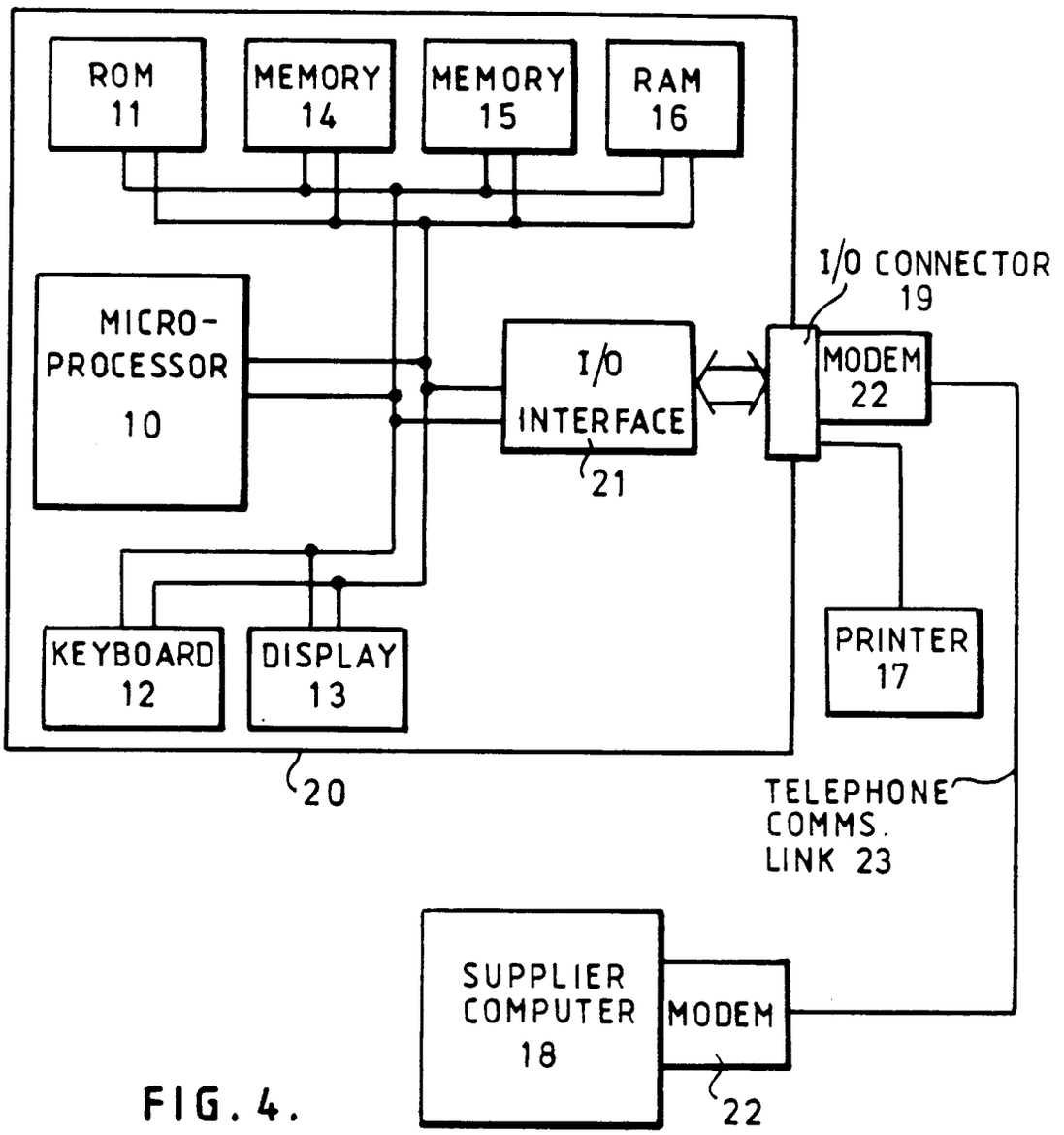
ROM
11
MEMORY
14
MEMORY
15
RAM
16
I/O CONNECTOR
19
MICRO-
PROCESSOR
10
I/O
INTERFACE
21
MODEM
22
KEYBOARD
12
DISPLAY
13
PRINTER
17
20
TELEPHONE
COMMS.
LINK 23
SUPPLIER
COMPUTER
18
MODEM
22

FIG. 4.