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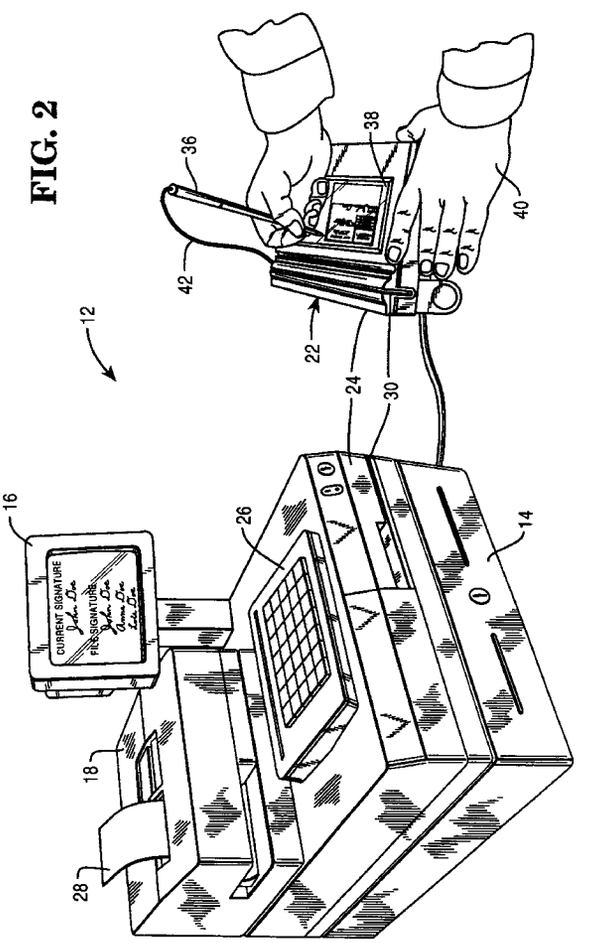
(54) Signature verification method.

(57) A signature verification method at a point of service (POS) work station requires only a single signature from a customer for purposes of verification and payment. Also, a signed receipt (22) is produced without requiring an additional signature. A first signature verification method begins by entering an account number by swiping a magnetic card containing the account number through a magnetic stripe reader (24). A POS terminal (14) sends the account number to a database (20). The database (20) sends a file signature associated with the account number from the database to the POS terminal (14). A customer enters a current signature by signing a representation of a receipt in a write input device (22) with a stylus (36). The current and file signatures are displayed one above the other on a monitor (16). Finally, an operator visually compares the current and file signatures. An alternative method visually compares a file signature with a signature on the back of the magnetic card (119), and then compares the card signature with a currently signed signature.

FIG. 2



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This invention relates to a signature verification method suitable for use in verifying signatures at a point of service (POS) work station.

It is current procedure in a retail checkout environment involving card-based transactions, for example, for a retail clerk to be instructed to compare a current signature with a signature on a customer's card. This signature verification method is unreliable because both signatures may be forged and because the method itself may be incorrectly performed, if at all.

The document US-A-4 617 457 discloses a system for cashing documents such as cheques, which utilizes a customer-operated automated teller machine (ATM) in cooperation with equipment at a teller station where a human teller also participates in the evaluation of the document itself. In a typical operation, customer inserts his personal identification card containing his account number, whereafter a PIN (personal identification number) verification procedure is effected. The customer then keys in the monetary amount of the cheque to be cashed and feeds the cheque into the ATM. MICR data on the cheque is then read to provide the account number of the drawer of the cheque. The drawer's account number, account balance and file signature are accessed from disk storage and visually displayed to the teller on a monitor screen. The drawee's account number, account balance and file signature are also displayed on the monitor screen, together with a visual image of the cheque. The teller then examines the screen and on the basis of a comparison of information on the displayed cheque image and retrieved data, including a signature comparison, permits or refuses the cheque cashing transaction.

It is an object of the present invention to provide a reliable signature verification method which is suitable for use in a retail transaction environment.

Therefore according to the present invention there is provided a signature verification method, characterized by the steps of: entering an account number into a terminal for a transaction; sending said account number to a database coupled to said terminal; sending a file signature associated with said account number from said database to said terminal; displaying said file signature; effecting a signature operation to provide a current signature; and visually comparing said current signature with said file signature.

It will be appreciated that in a signature verification method according to the invention, high reliability is achievable in a retail transaction, since a currently entered signature is visually compared with a file signature derived from a database, thereby reducing the likelihood of a fraudulent signature-based transaction being accepted.

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

Fig. 1 is a block diagram of a system used in implementing a first embodiment of the method of the present invention;

Fig. 2 is a perspective view of a POS work station which is part of the system of Fig. 1;

Fig. 3 is a flow diagram of a first embodiment of the method of the present invention;

Fig. 4 is a view showing current and file signatures in accordance with a first embodiment of the present invention;

Fig. 5 is a block diagram of a system used in implementing a second embodiment of the method of the present invention;

Fig. 6 is a perspective view of a POS work station which is part of the system of Fig. 5;

Fig. 7 is a flow diagram of a second embodiment of the method of the present invention;

Fig. 8 is a view showing file and magnetic card signatures in accordance with a second embodiment of the present invention; and

Fig. 9 is a flow diagram of a method for entering signatures into a signature database.

Turning now to Figs. 1 and 2, the point of service (POS) work station 12 is part of a system 10, which in a first embodiment includes a point of service (POS) terminal 14, a monitor 16, a printer 18, a signature database 20, a write input apparatus 22, and an optional magnetic stripe reader (MSR) 24.

The POS terminal 14 is the heart of the system 10. It can be any suitable device of that type, such as a class 7052 terminal with monochrome monitor, marketed by NCR Corporation, Dayton, Ohio. Keyboard 26 may be used to enter account information if there is no magnetic stripe reader 24, or if a card's magnetic stripe is demagnetized or damaged.

The monitor 16 may also be separate from the POS terminal 14. However, the disclosed monitor 16 is conveniently mounted on the POS terminal 14, within the scan of a clerk.

Printer 18 will most likely be used for printing customer receipts such as the receipt 28 which is shown as issuing from an aperture in the housing of the printer 18. However, the printer 18 only prints receipts on an as needed basis. Other types of record media could also be generated by the printer 18, if desired, in response to the needs of the system 10. Any suitable printer may be employed, such as the Epson RP265, marketed by Epson America, Inc., Torrance, California.

The system 10 may also include a magnetic stripe reader (MSR) 24, either in the write input apparatus 22 or in the POS terminal 14, having a slot 30 through which a card bearing magnetic indicia may be swiped so that the data thereon can be inputted by, stored in, and used by the system 10. The magnetic stripe reader 24, if installed, may be an integral part of either the POS terminal 14 or the write input apparatus 22, or

may be a separate device. Here, the magnetic stripe reader 16 is shown as part of the POS terminal 14.

The signature database 20 could be any currently maintained database, controlled by a central processing unit (CPU), which references an account number to a signature. The present invention envisions the use of outside databases currently maintained by financial institutions.

The write input apparatus 22 captures signatures electronically. A system employing a pressure pad digitizer without a display may be used. In such a case, an ordinary pen may be used as a writing instrument for signing directly on a receipt provided on the digitizer.

In the preferred embodiment, however, this write input apparatus 22 is as shown in block form in phantom lines and employs commercially available components, including a liquid crystal display (LCD) module 32, and a transparent digitizer and controller 34 with associated stylus 36. The write input apparatus 22 includes a transparent surface 38 through which a representation of a receipt may be seen and upon which information may be entered by writing thereon with the stylus 36 by a customer 40. The stylus 36 is connected to the apparatus by an electrically conductive line 42. The captured signature may be automatically printed on the receipt in the terminal 14.

System connections are straightforward. The optional LCD display 32 is connected via a path 46 to the POS terminal 14. The touch screen and controller 34 is connected to the POS terminal 14 by an RS232 data bus 48, and a similar RS232 data bus 52 connects the POS terminal 14 to the signature database 20. If a signature database from an outside source is employed, modems 54 and 56 can be employed in addition to the RS232 data bus 52 to link the POS terminal 14 to the signature database 20. The POS terminal 14 may also be connected to other data processing facilities in an establishment in which it is used, such as a STARLAN store network.

Referring now to Fig. 3, a first embodiment of the signature verification method 60 is shown, starting with the start block 62. In block 64, the POS terminal 14 queries the write input apparatus 22 to see if any signature data is available. If no data is available, the query continues indefinitely until signature data is available. To enter signature data, the stylus 36 is used to sign a representation of a receipt appearing on the display 32 below the digitizer 34.

Advantageously, only one signature is required for transfer of funds and signature verification. Furthermore, signature entry produces a receipt without requiring an additional signature. Only one piece of paper, a receipt, is produced by the printer 18, and only as needed. In a retail checkout environment, the debit/ credit funds transfer would be payment and the receipt would be a receipt of charge (ROC).

After signature data is received, it is reconstructed and displayed, in block 66, on the monitor 16 of the POS terminal 14. In block 68, the account number is entered into the POS terminal 14 either by entering it manually or by swiping a magnetic card containing account information on its magnetic stripe through the magnetic stripe reader 24. In block 70, the POS terminal 14 sends the account number to the signature database 20 where it is received and is used in block 72 to query the database for signature data corresponding to the account number.

If the account number is on file in the signature database 20, the signature database 20 sends the file signature to the POS terminal 14. In block 76, the file signature is displayed on the monitor 20 below the current signature already displayed back in block 66. The current and file signatures are then visually compared in block 77.

In block 80, if the comparison in block 77 results in the conclusion that the current signature and the file signature are not sufficiently alike, then the transaction is rejected in block 82 and the method 60 returns to block 62. If the current signature is valid, then the transaction is completed by the operator in block 84. The method 60 than returns to block 62.

If the account number is not on file in block 72, then the clerk checks the card for a signature in block 74. If no card signature is available, the transaction is rejected in block 82. If a card signature is available, then the clerk must resort to a visual comparison of the card and current signatures in block 78. A valid comparison of the current and card signatures in block 80 leads to the transaction being finalized in block 84. After block 84, the method 60 returns to block 62.

Turning now to Fig. 4, a view of the monitor 16 is shown. Advantageously, the file signature 86 and the current signature 88 are displayed one over the other for easy letter-by-letter comparison by the clerk.

Turning now to Figs. 5 and 6, there are shown the system 90 and work station 92 to be used in implementing the second embodiment of the method of the present invention. Figs. 5 and 6 are identical to Figs. 1 and 2, except the system 10 of Fig. 5 and the work station 12 of Fig. 6 do not include the write input apparatus 22.

Referring now to Fig. 7, there is shown a flow diagram of the second embodiment 93 of the method of the present invention, starting with the start block 94. In block 96, the account number is entered into the POS terminal 14 either by entering it manually or by swiping a magnetic card containing account information on its magnetic stripe through the magnetic stripe reader 16. In block 98, the POS terminal 14 sends the account number to the signature database 20 where it is received and is used in block 100 to query the database for signature data corresponding to the account number.

If the account number is on file in the signature

database 20, the signature database 20 sends the file signature to the POS terminal 14. In block 102, the file signature is displayed on the monitor 16.

In block 104, if a card signature is available, the card signature is compared with the file signature in block 106. If the comparison results in the conclusion in block 108 that the file signature and the card signature are not sufficiently alike, then the transaction is rejected in block 110 and the method 93 returns to block 94.

If the card signature is valid, then the card signature is compared with the current signature on a check or receipt in block 114. If the comparison results in the conclusion in block 116 that the current signature is valid, then the transaction is completed by the clerk in block 118. The method 93 then returns to block 94.

If the account number is not on file in block 100, then the clerk resorts to checking for a card signature in block 120 and visually comparing the card signature with the current signature in block 114. If there is no card signature or if a comparison between the card and current signatures results in an invalid signature, then the transaction is rejected in block 110. Otherwise, if a comparison of the card and current signatures results in a valid signature, then the transaction is finalized in block 118 and the method 93 returns to block 94.

Turning now to Fig. 8, a view of the monitor 20 and magnetic card 119 is shown. Advantageously, the file signature 86 and the card signature 87 can be easily compared by placing the card signature under the file signature.

Both the first and second embodiments of the method of the present invention are envisioned primarily for use in a retail checkout, in which signature verification must be performed contemporaneously with retail transactions. The embodiments are designed, however, to be suitable for use in other environments, such as financial environments, as well. It will be appreciated that both embodiments have the advantage that a simple signature from a customer serves both for verification and for payment, and that a signed receipt is produced without requiring an additional signature.

Turning now to Fig. 9, there is shown a flow diagram illustrating a method 122 for entering signatures in a signature database 20, such as a database to be maintained by a financial institution. It is envisioned that signatures be captured and stored in the database by using the write input apparatus 22. Signatures may be entered manually or automatically, without a database operator.

The method 122 begins at start 124 when a bank customer wishes to enter new or current legal signatures, corresponding to account numbers already on file, into the signature database 20. The bank has a write input apparatus 22 which is coupled to one of the bank's financial terminals, which is similar to the POS terminal 14. In connection with the transaction, the customer enters an account number either by the magnetic stripe reader 24 or by hand at the keyboard of the bank's financial terminal. In block 126, the a database operator waits for account numbers to be received from the bank's financial terminal over line 52. In block 128, after the account number is received by the database operator, it is displayed on a monitor similar to monitor 16.

In block 130, the database operator waits for a customer whose account number has been entered to sign his name on a write input apparatus 22 or similar device. After receiving the signature, the operator transmits the account number and signature to the signature database 20 in block 132. In block 134, if more signatures are to be entered for the same account number, the method 122 returns to block 130 to await entry of the signatures into the write input apparatus 22. If no more signatures are to be entered for the same account number, in block 136 the display is cleared to allow a new account number to be entered and the method 122 returns to block 124.

Claims

1. A signature verification method, characterized by the steps of: entering an account number into a terminal (14) for a transaction; sending said account number to a database (20) coupled to said terminal (14); sending a file signature associated with said account number from said database (20) to said terminal (14); displaying said file signature; effecting a signature operation to provide a current signature; and visually comparing said current signature with said file signature.

2. A method according to claim 1, characterized in that said step of entering an account number includes reading said account number from a card having said account number stored thereon.

3. A method according to claim 1, characterized in that said step of entering an account number includes keying said account number into a keyboard (26) associated with said terminal (14).

4. A method according to any one of the preceding claims, characterized in that said step of effecting a signature operation includes applying a signature to a representation of a record member on a write input apparatus (22).

5. A method according to claim 4, characterized by the step of reproducing the signature entered in said write input apparatus (22) on a receipt (28).

6. A method according to any one of claims 1 to 3,

characterized in that said step of effecting a signature operation includes writing a signature on a receipt overlying a pressure pad digitizer.

7. A method according to any one of the preceding claims, characterized in that said step of visually comparing includes displaying said current signature and said file signature on a display monitor (16) associated with said terminal (14).

8. A method according to any one of claims 1 to 3 characterized in that said step of effecting a signature operation includes signing a current signature on a record member, and in that said step of visually comparing said current signature with said file signature includes the steps of visually comparing said file signature with a signature on a card (119) and visually comparing said current signature with said signature on said card (119).

9. A method according to any one of the preceding claims, characterized in that said transaction is a retail transaction.

FIG. 1

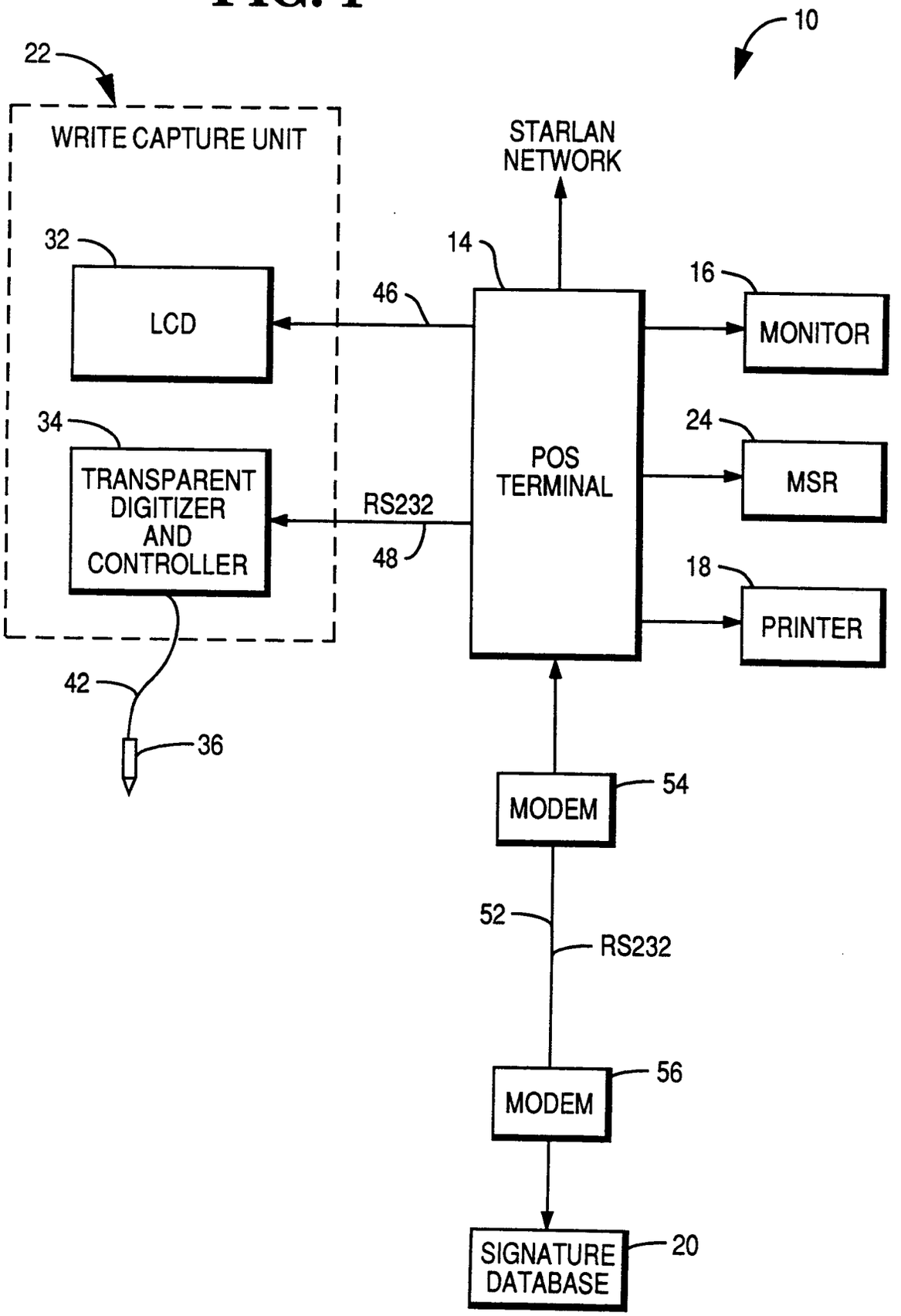

10
22
WRITE CAPTURE UNIT
STARLAN NETWORK
32
LCD
14
46
16
MONITOR
34
TRANSPARENT DIGITIZER AND CONTROLLER
RS232
48
POS TERMINAL
24
MSR
18
PRINTER
42
36
MODEM
54
52
RS232
MODEM
56
SIGNATURE DATABASE
20

FIG. 2

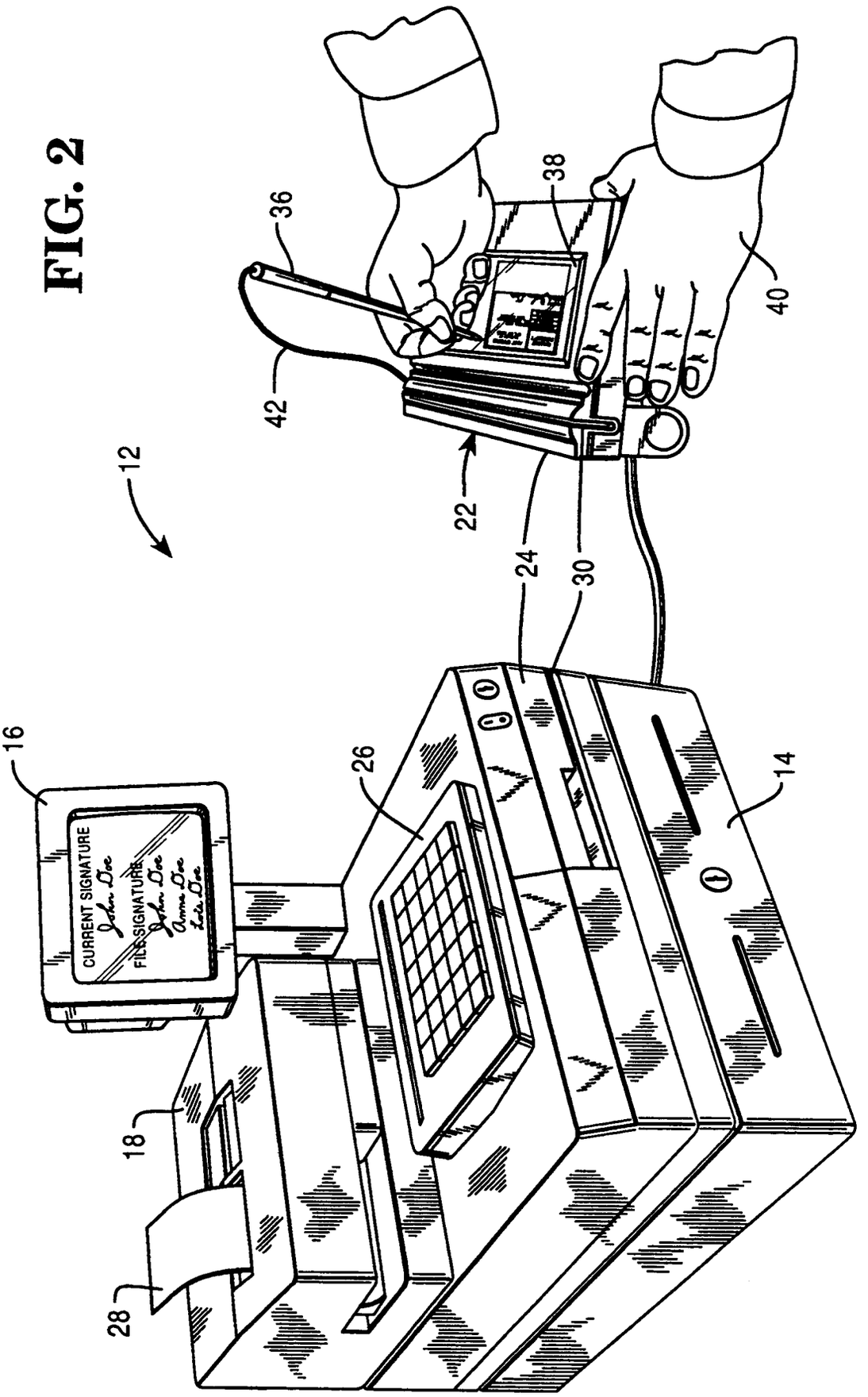

12
16
CURRENT SIGNATURE
John Doe
FILE SIGNATURE
John Doe
Anne Doe
Lee Doe
18
28
26
14
22
24
30
36
38
40
42

FIG. 3

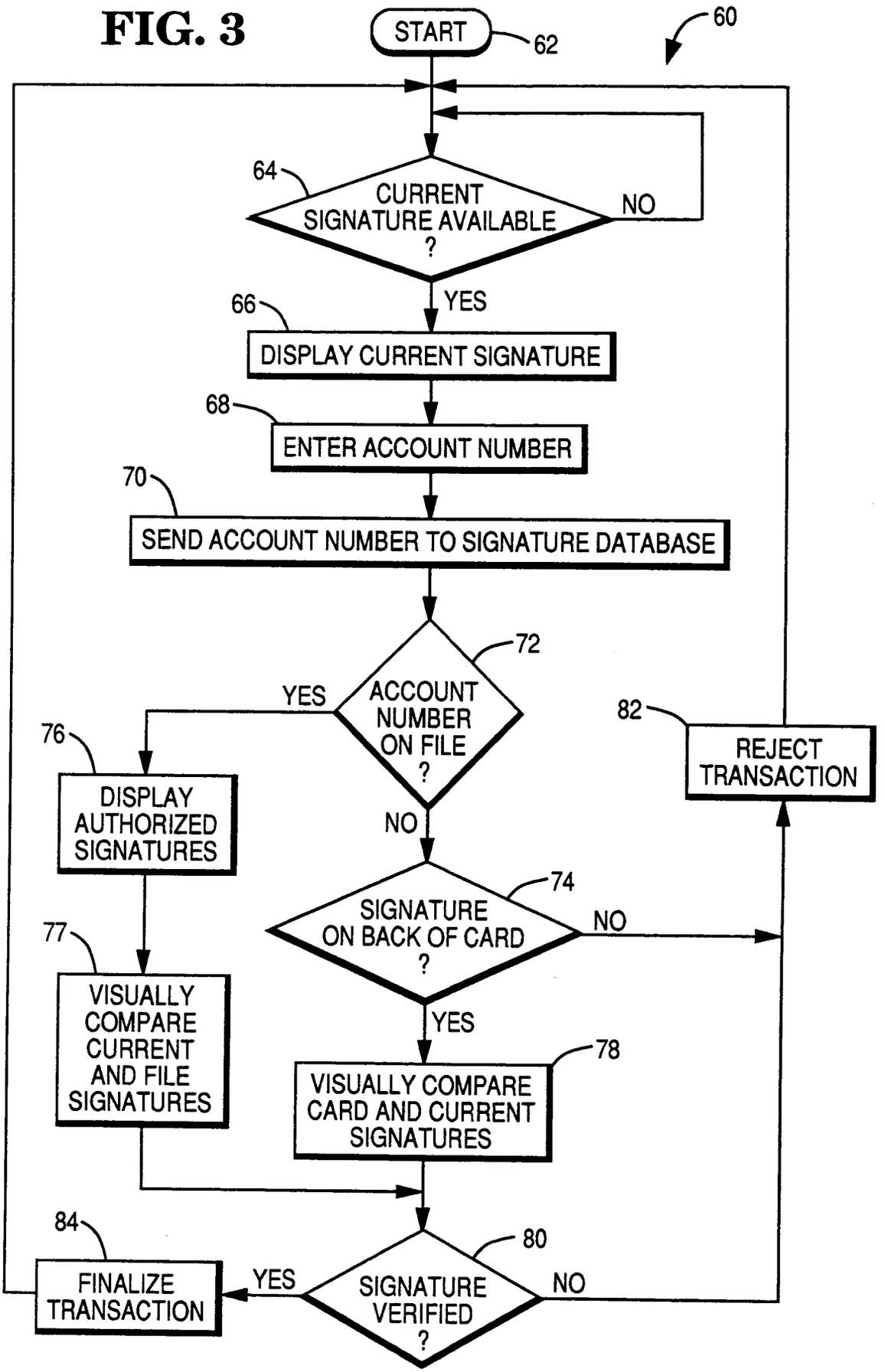

START
62
60
64
CURRENT SIGNATURE AVAILABLE ?
NO
YES
66
DISPLAY CURRENT SIGNATURE
68
ENTER ACCOUNT NUMBER
70
SEND ACCOUNT NUMBER TO SIGNATURE DATABASE
72
ACCOUNT NUMBER ON FILE ?
YES
NO
76
DISPLAY AUTHORIZED SIGNATURES
77
VISUALLY COMPARE CURRENT AND FILE SIGNATURES
74
SIGNATURE ON BACK OF CARD ?
NO
YES
78
VISUALLY COMPARE CARD AND CURRENT SIGNATURES
82
REJECT TRANSACTION
80
SIGNATURE VERIFIED ?
YES
NO
84
FINALIZE TRANSACTION

FIG. 4

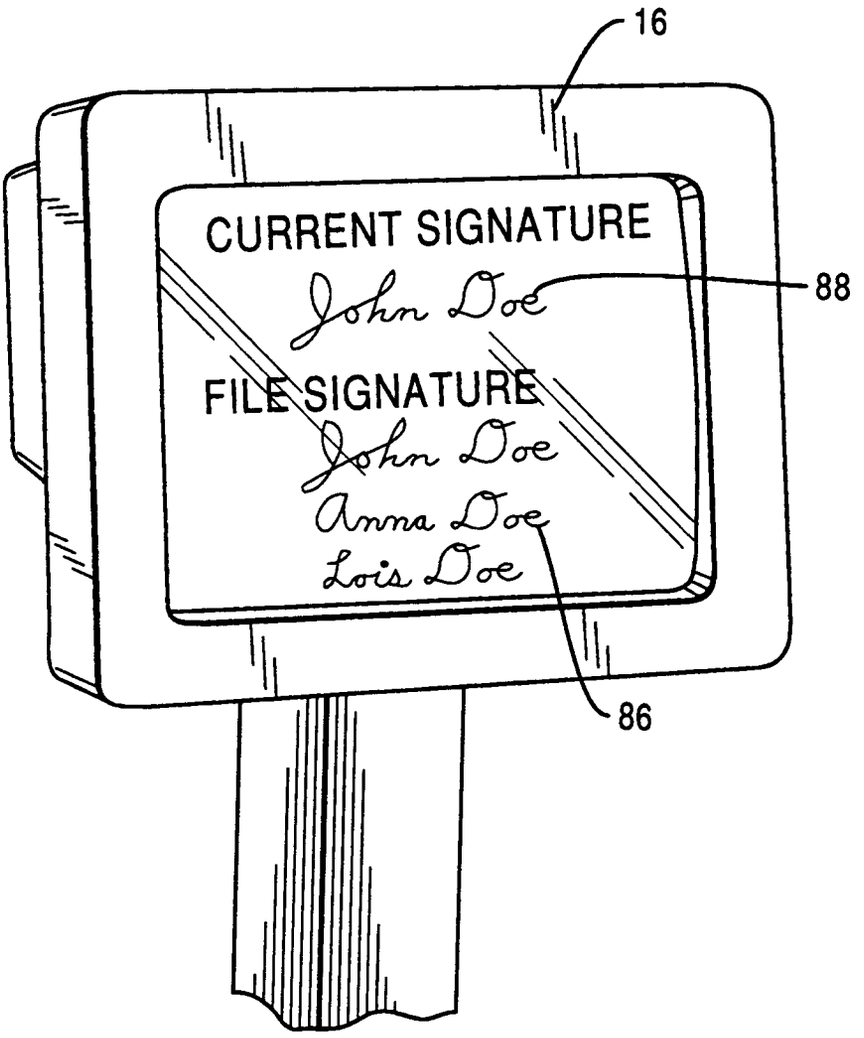

16
CURRENT SIGNATURE
John Doe
88
FILE SIGNATURE
John Doe
Anna Doe
Lois Doe
86

FIG. 5

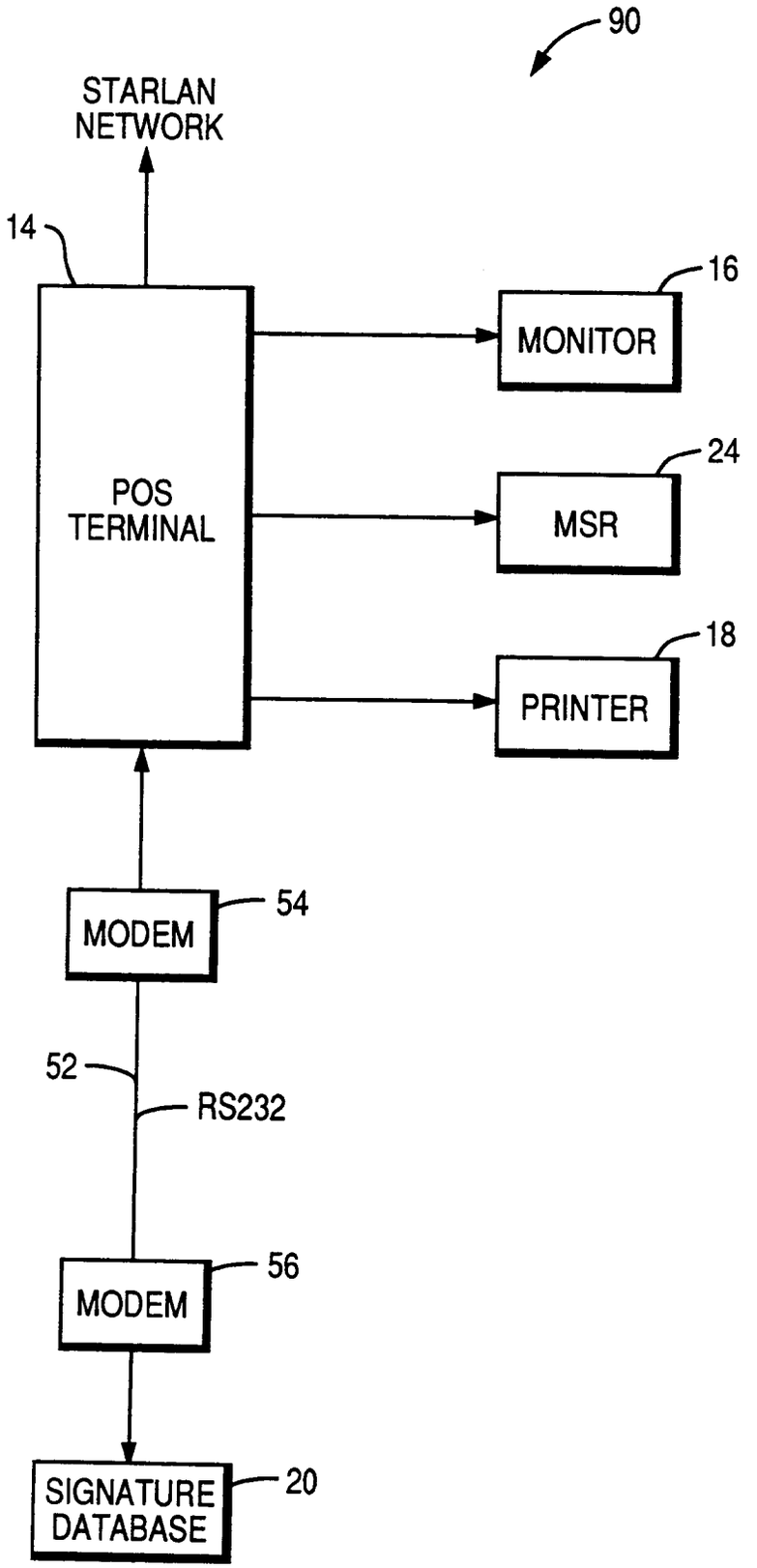

90
STARLAN NETWORK
14
16
MONITOR
POS TERMINAL
24
MSR
18
PRINTER
MODEM
54
52
RS232
MODEM
56
SIGNATURE DATABASE
20

FIG. 6

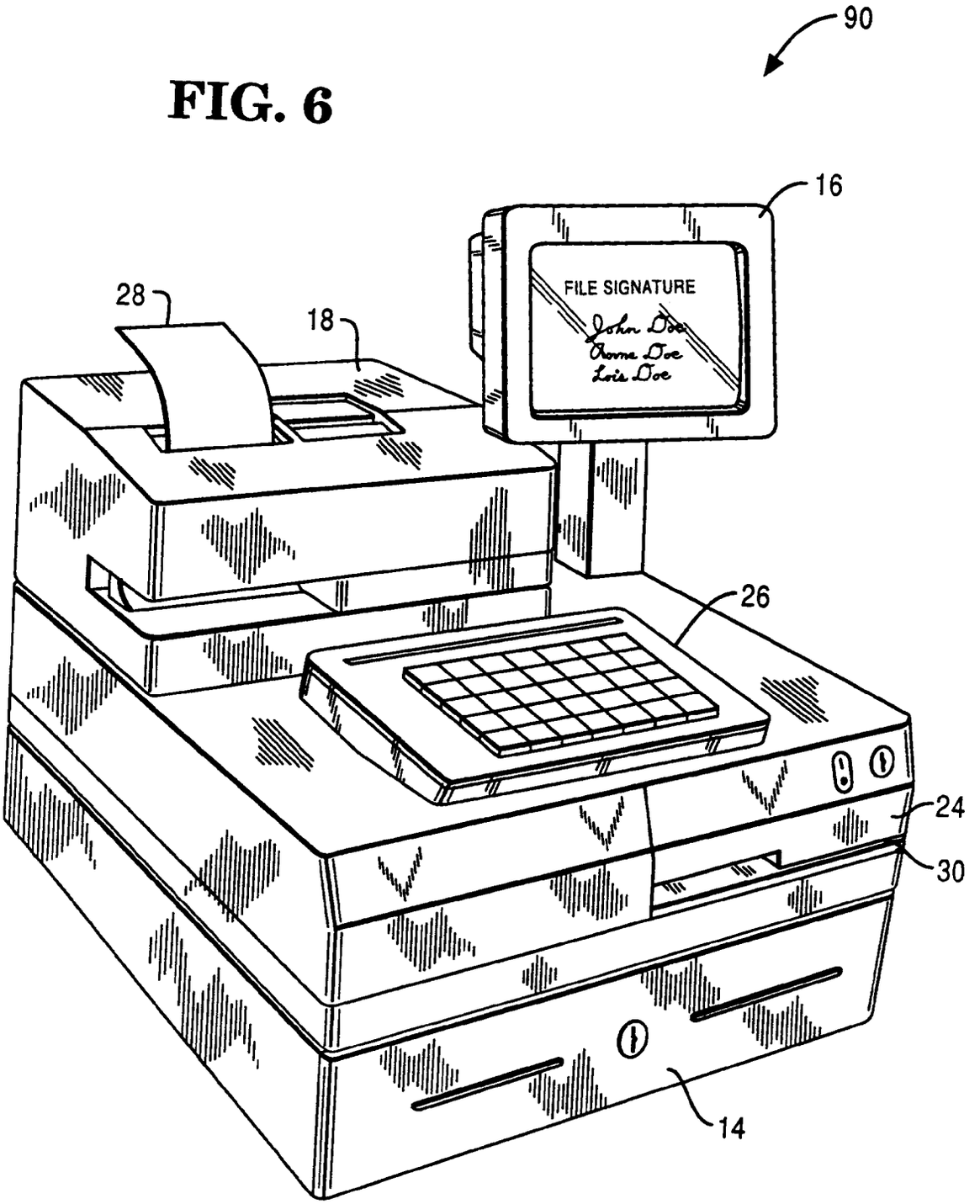

90
16
28
18
FILE SIGNATURE
John Doe
Anne Doe
Lois Doe
26
24
30
14

FIG. 7

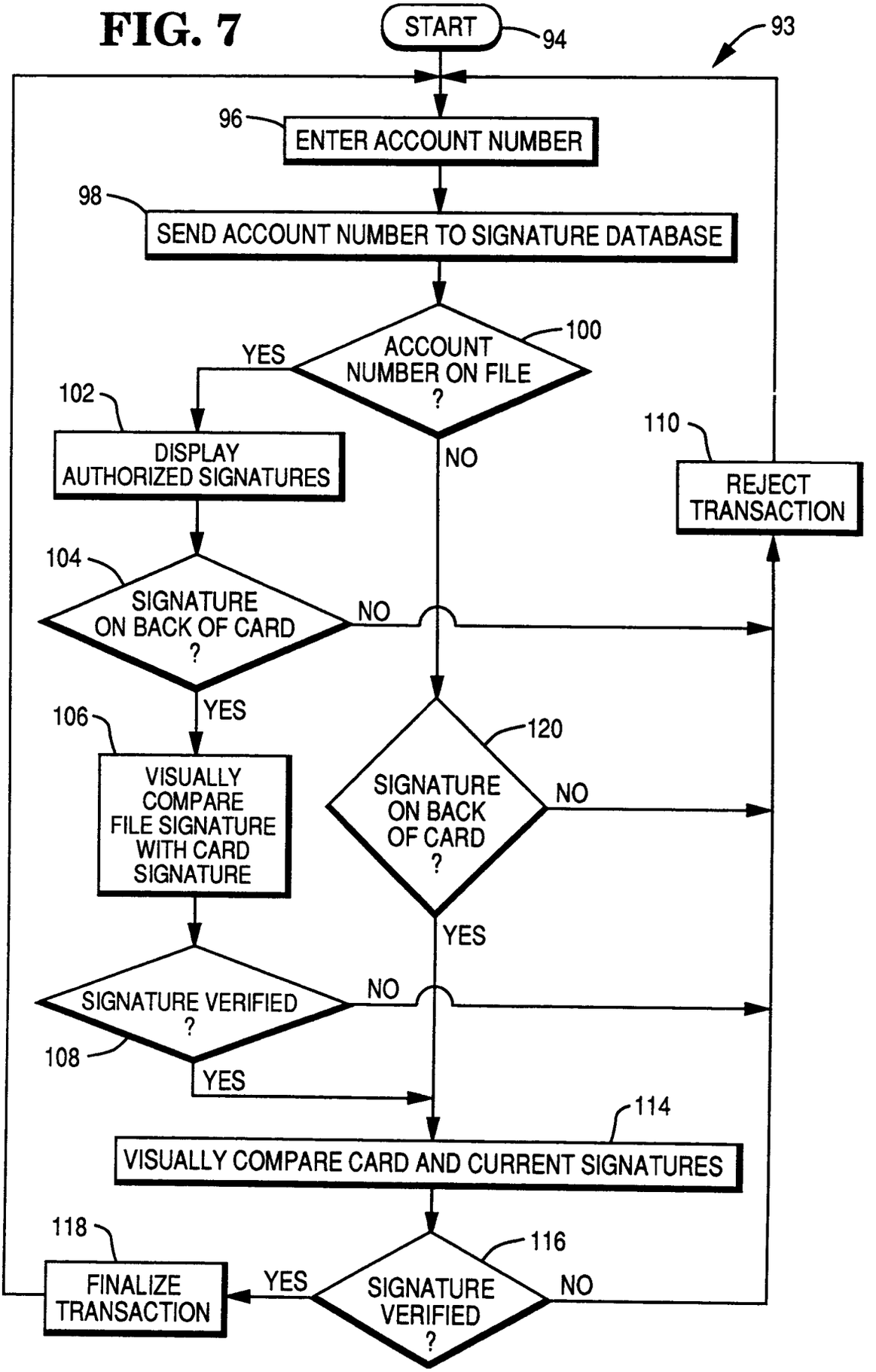

START
94
93
96
ENTER ACCOUNT NUMBER
98
SEND ACCOUNT NUMBER TO SIGNATURE DATABASE
100
ACCOUNT NUMBER ON FILE ?
YES
NO
102
DISPLAY AUTHORIZED SIGNATURES
110
REJECT TRANSACTION
104
SIGNATURE ON BACK OF CARD ?
NO
YES
106
VISUALLY COMPARE FILE SIGNATURE WITH CARD SIGNATURE
120
SIGNATURE ON BACK OF CARD ?
NO
YES
SIGNATURE VERIFIED ?
NO
108
YES
114
VISUALLY COMPARE CARD AND CURRENT SIGNATURES
118
FINALIZE TRANSACTION
YES
116
SIGNATURE VERIFIED ?
NO

FIG. 8

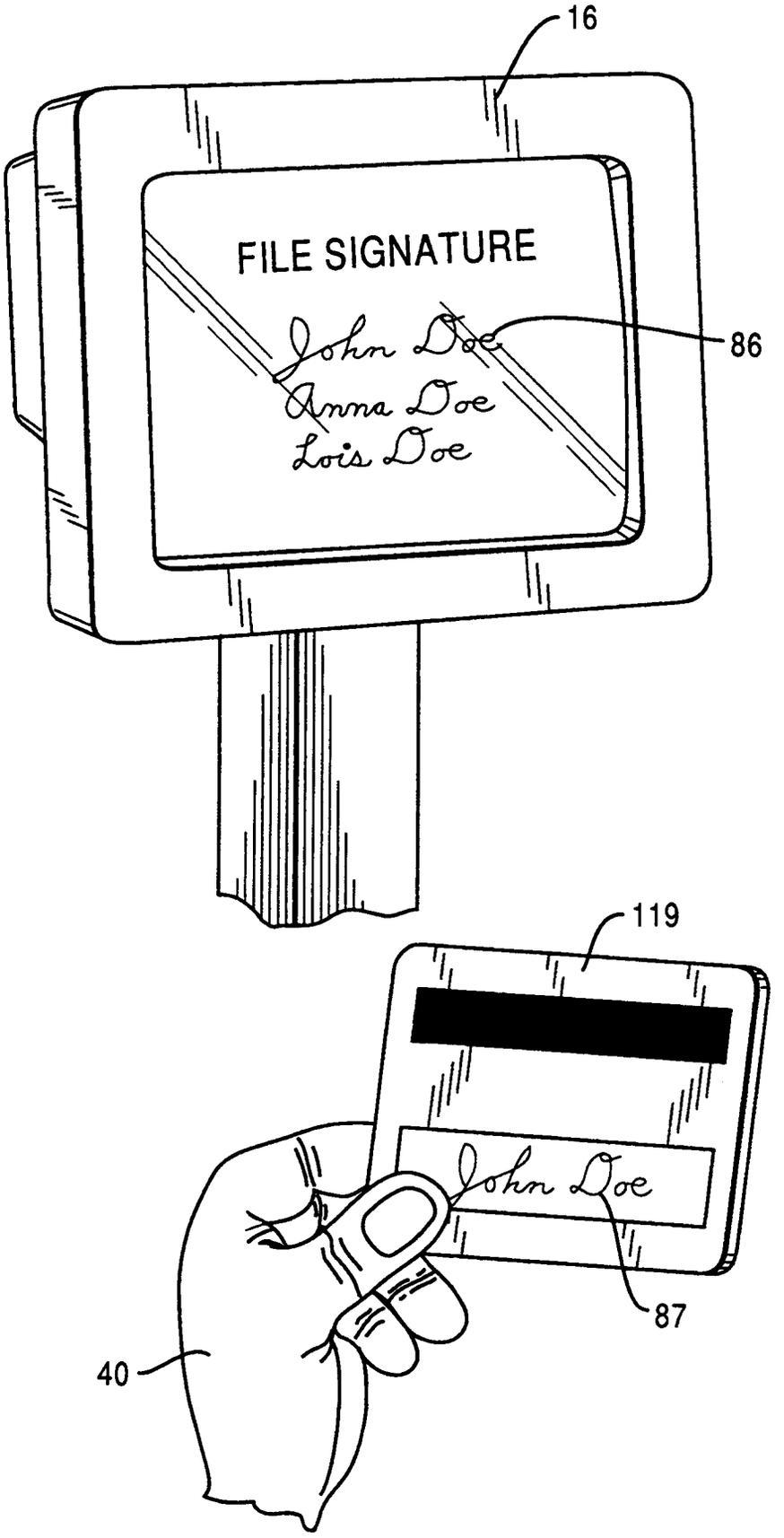
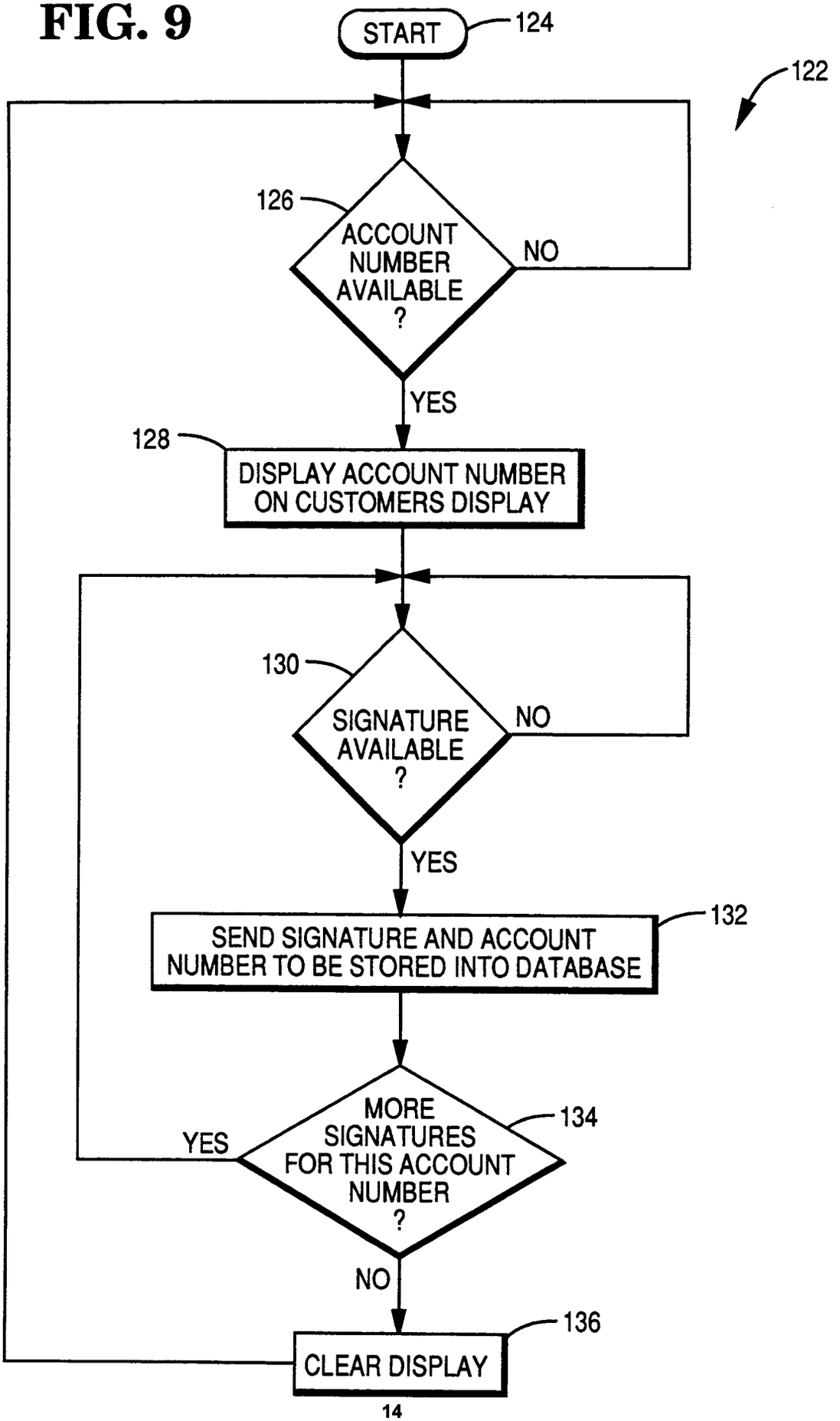

16
FILE SIGNATURE
John Doe
Anna Doe
Lois Doe
86
119
John Doe
87
40

FIG. 9


START
124
122
126
ACCOUNT NUMBER AVAILABLE ?
NO
YES
128
DISPLAY ACCOUNT NUMBER ON CUSTOMERS DISPLAY
130
SIGNATURE AVAILABLE ?
NO
YES
132
SEND SIGNATURE AND ACCOUNT NUMBER TO BE STORED INTO DATABASE
134
MORE SIGNATURES FOR THIS ACCOUNT NUMBER ?
YES
NO
136
CLEAR DISPLAY