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United States Patent [19]

Ishiguro et al.

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[54] **METHOD AND APPARATUS FOR SETTLEMENT OF ACCOUNTS BY IC CARDS**

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[21] Appl. No.: **119,850**

[22] Filed: **Sep. 13, 1993**

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Sep. 18, 1992	[JP]	Japan	4-249294
Sep. 18, 1992	[JP]	Japan	4-308688
Nov. 26, 1992	[JP]	Japan	4-317254
Nov. 26, 1992	[JP]	Japan	4-317255

[51] **Int. Cl.**[6] **H04L 9/30**

[52] **U.S. Cl.** **380/25;** 380/30

[58] **Field of Search** 380/24, 25, 30

[56] **References Cited**

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Attorney, Agent, or Firm—Pollock, Vande Sande and Priddy

[57] **ABSTRACT**

An IC card has a card information memory area wherein there are written a master public key nA, card secret keys pU and qU, a card public key nU, a card identification number IDU, and a first master digital signature SA1 for information including the card identification number. An IC card terminal has terminal information memory area wherein there are written a master public key nA, terminal secret keys pT and qT, a terminal public key nT, a terminal identification number IDT, and a second master digital signature SA2 for information including the terminal identification number IDT. When inserted into the IC card terminal, the IC card sends thereto the data nU, IDU, and SA1. The IC card terminal verifies the digital signature SA1 by the master public key nA and, if it is valid, transmits the data nT, IDT and SA2 to the IC card. The IC card verifies the digital signature SA2 by the master public key nA and, if it is valid, transmits information corresponding to the current remainder value V to the IC card terminal. The IC card terminal makes a check to see if the received information corresponding to the remainder value V is appropriate, and if so, becomes enabled for providing a service.

12 Claims, 16 Drawing Sheets

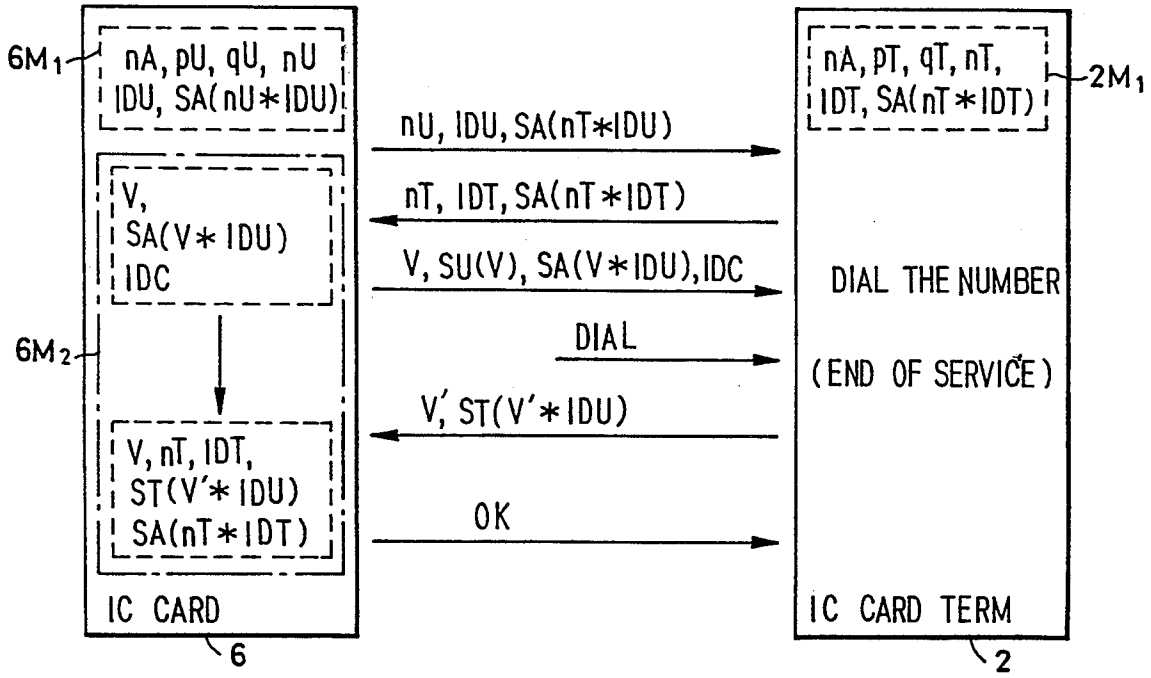


FIG. 1

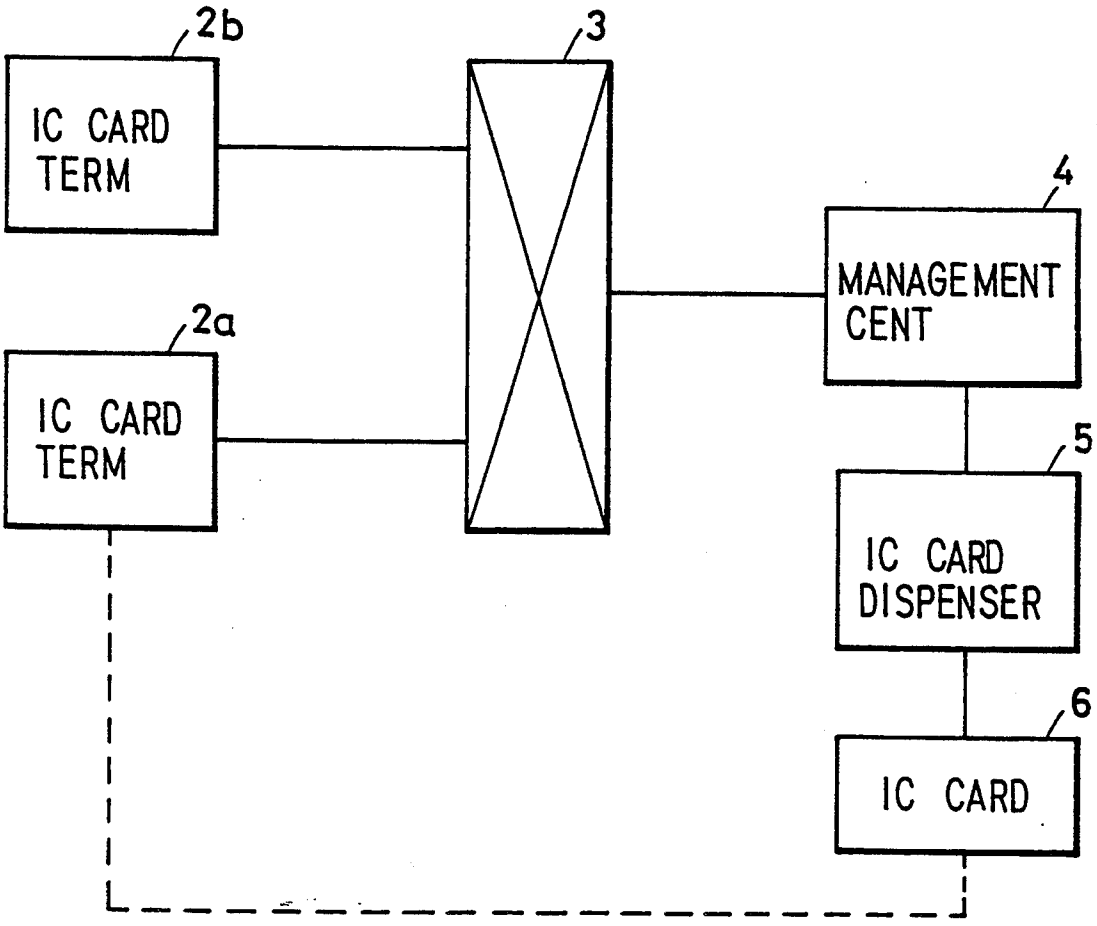


FIG. 2

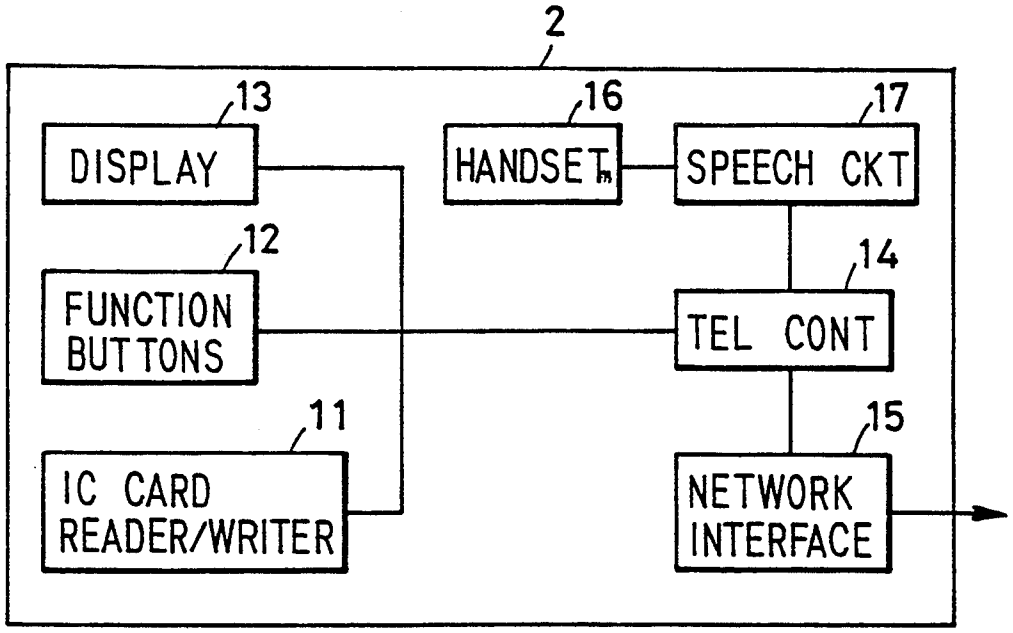


FIG. 3

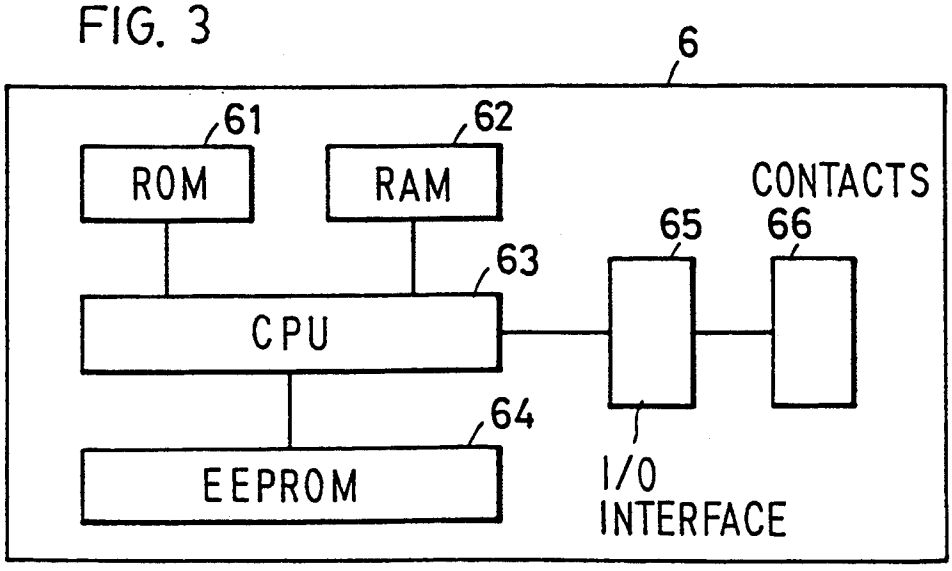


FIG. 4A

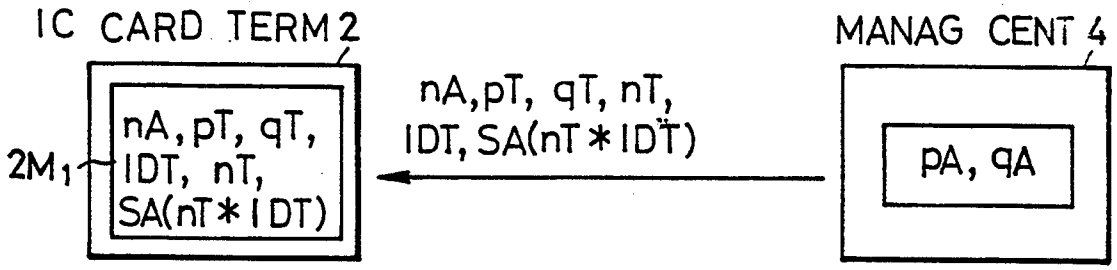


FIG. 4B

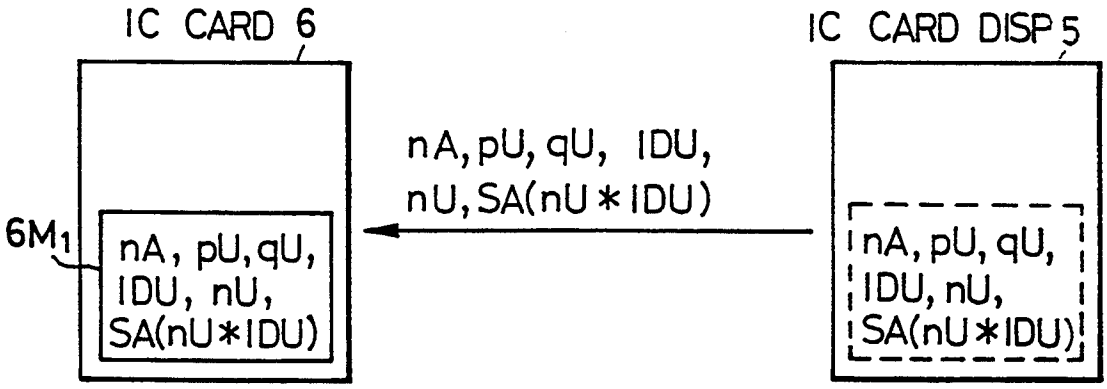


FIG. 4C

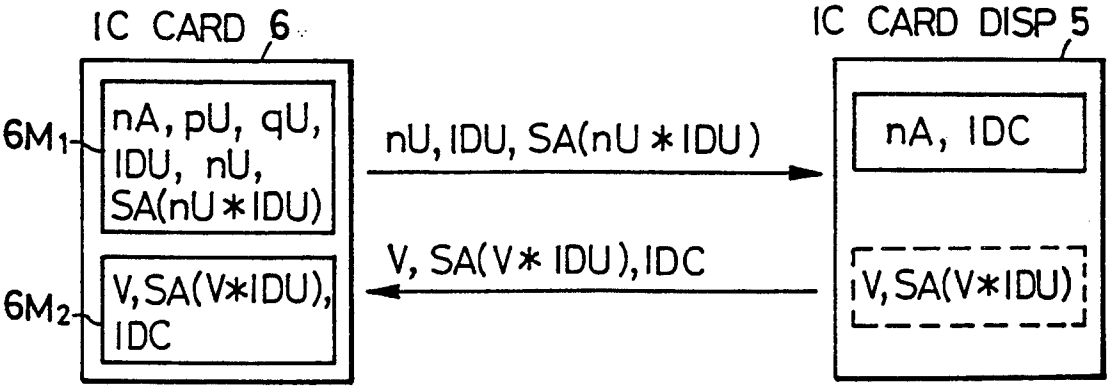
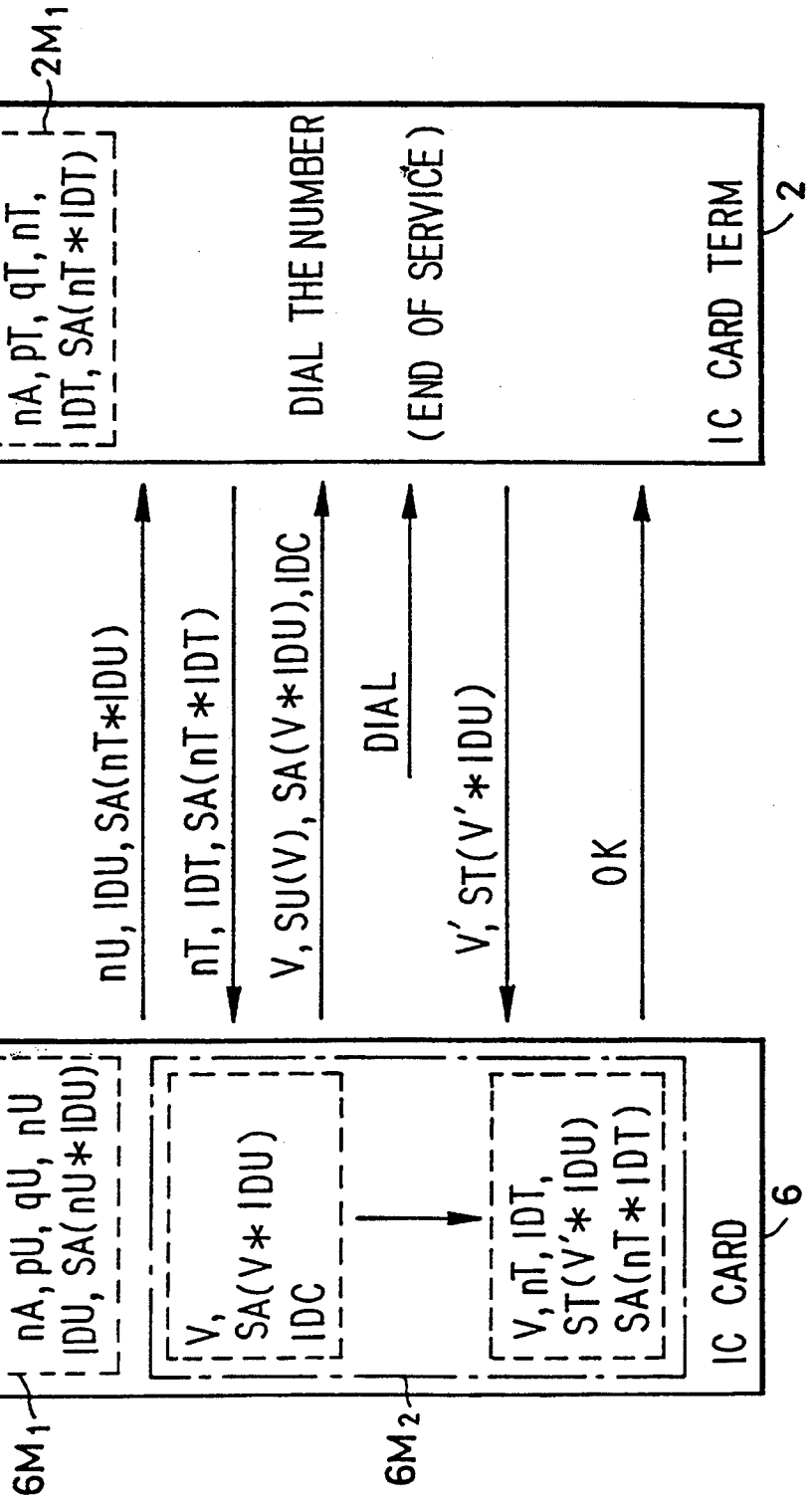


FIG. 5



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