US011018724B2

(12) **United States Patent**
Xie et al.

(10) Patent No.: **US 11,018,724 B2**
(45) **Date of Patent:** **May 25, 2021**

(54) **METHOD AND APPARATUS FOR EMULATING MULTIPLE CARDS IN MOBILE DEVICES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1699 days.

(21) Appl. No.: **13/782,948**

(22) Filed: **Mar. 1, 2013**

(65) **Prior Publication Data**

US 2013/0178159 A1 Jul. 11, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/350,832, filed on Jan. 16, 2012, now abandoned, which is a
(Continued)

(51) **Int. Cl.**
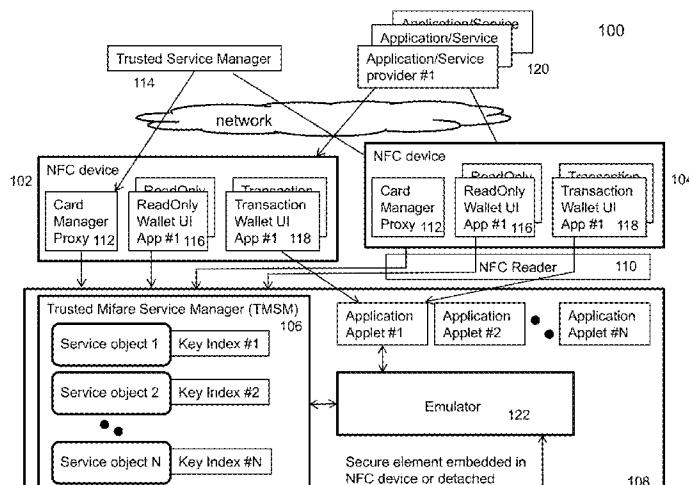*H04B 5/00* (2006.01)
G06Q 30/06 (2012.01)
(Continued)

(52) **U.S. Cl.**
CPC *H04B 5/0056* (2013.01); *G06Q 20/227* (2013.01); *G06Q 20/322* (2013.01);
(Continued)

(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

Techniques for mobile devices configured to support or function as multiple contactless cards, such as Mifare contactless cards, are disclosed. According to one embodiment, a mobile device embedded with an emulator is loaded with a plurality of software modules or applications, each emulating one card or one type of contactless cards. An emulator is implemented in a secure element that is personalized for a user of the mobile device while the applications are respectively provisioned via their respective providers per the personalized secure element. When the mobile device is to be used as a contactless card to perform a monetary function, a corresponding application is loaded into and executed in the emulator. When the mobile device is to be used to perform another monetary function, a corresponding application is loaded into the emulator to replace the previous application entirely or partially in the emulator. As a result, the mobile device can be used as a monetary device in lieu of multiple contactless cards.
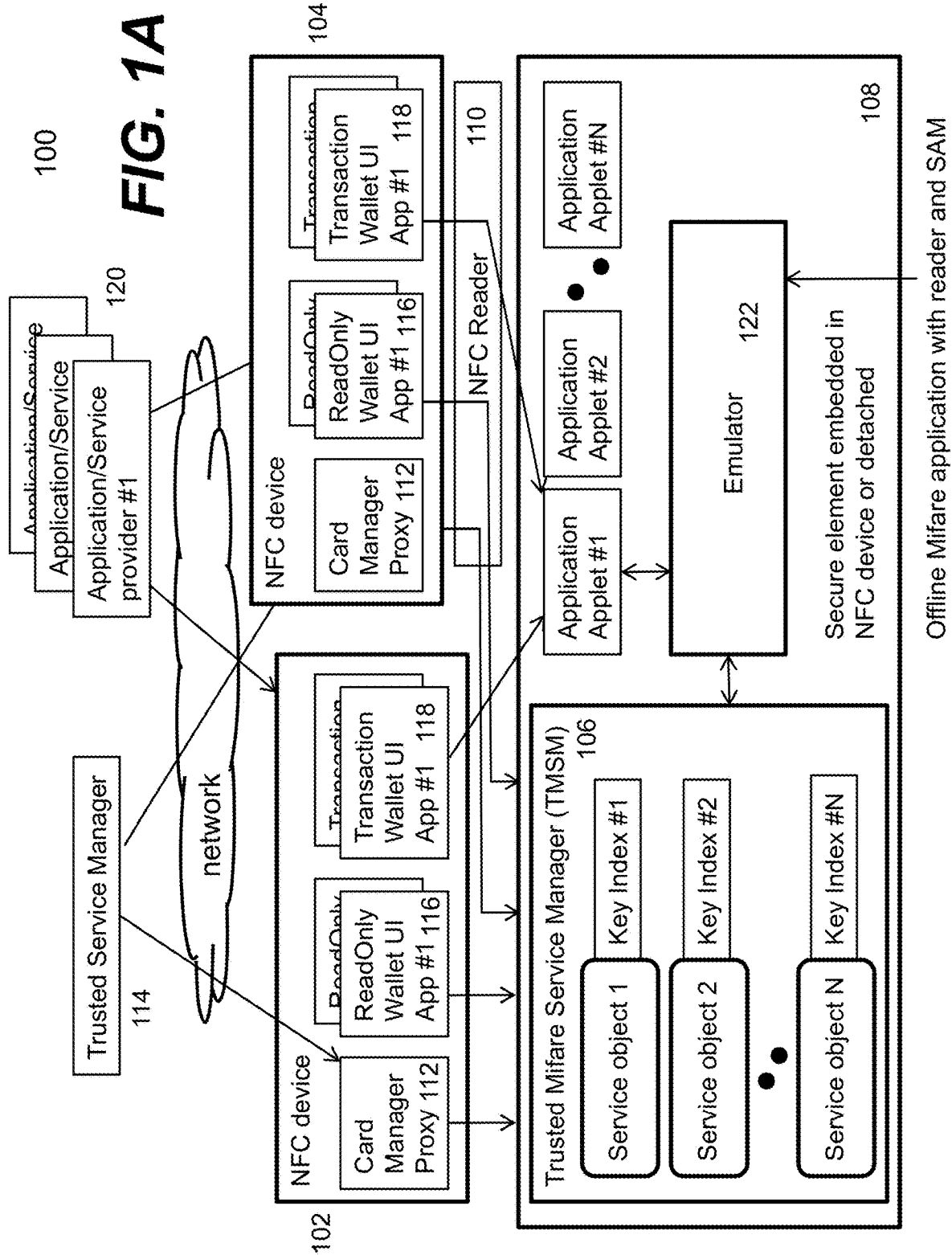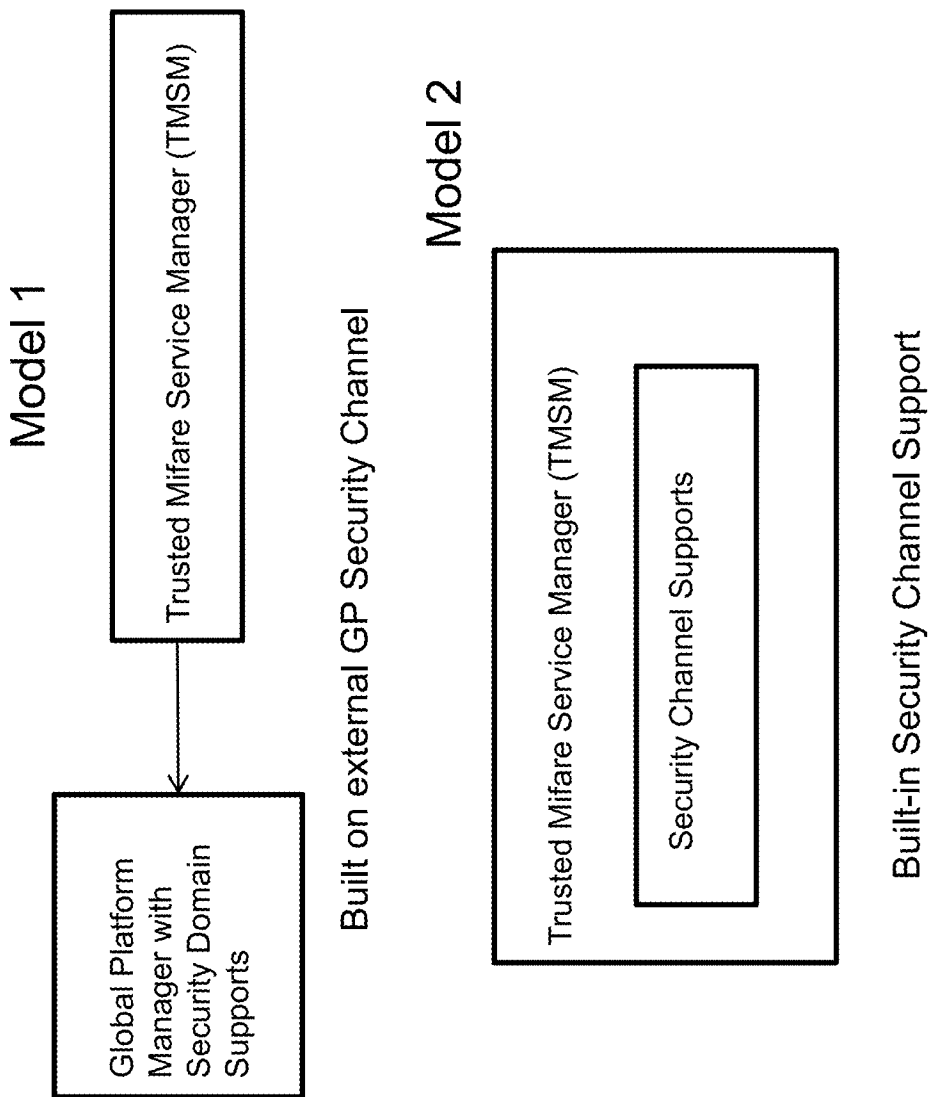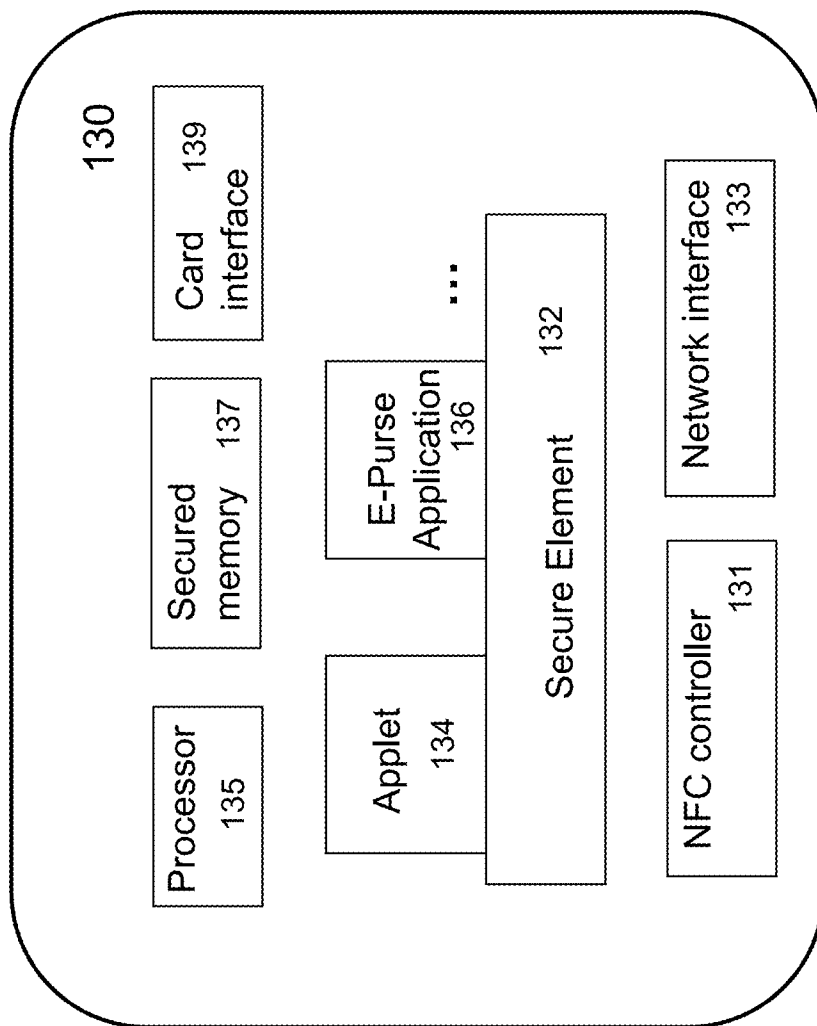
11 Claims, 35 Drawing Sheets

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Page 2

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FIG. 1A

100

120
Application/Service
Application/Service provider #1

114
Trusted Service Manager

network

104
NFC device
- Transaction Wallet UI App #1 **118**
- ReadOnly Wallet UI App #1 **116**
- Card Manager Proxy **112**

110
NFC Reader

102
NFC device
- Transaction Wallet UI App #1 **118**
- ReadOnly Wallet UI App #1 **116**
- Card Manager Proxy **112**

108
- Application Applet #N
- Application Applet #2
- Application Applet #1
- Emulator **122**

Secure element embedded in NFC device or detached

Offline Mifare application with reader and SAM

106
Trusted Mifare Service Manager (TMSM)
- Service object 1 | Key Index #1
- Service object 2 | Key Index #2
- Service object N | Key Index #N

Model 1

Trusted Mifare Service Manager (TMSM)

Global Platform Manager with Security Domain Supports

Built on external GP Security Channel

Model 2

Trusted Mifare Service Manager (TMSM)

Security Channel Supports

Built-in Security Channel Support

FIG. 1B

FIG. 1C

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