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(54) **MULTI-JURISDICTIONAL SECURE AND TRUSTED CRYPTOCURRENCY ACCEPTANCE SYSTEM**

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(51) **Int. Cl.**

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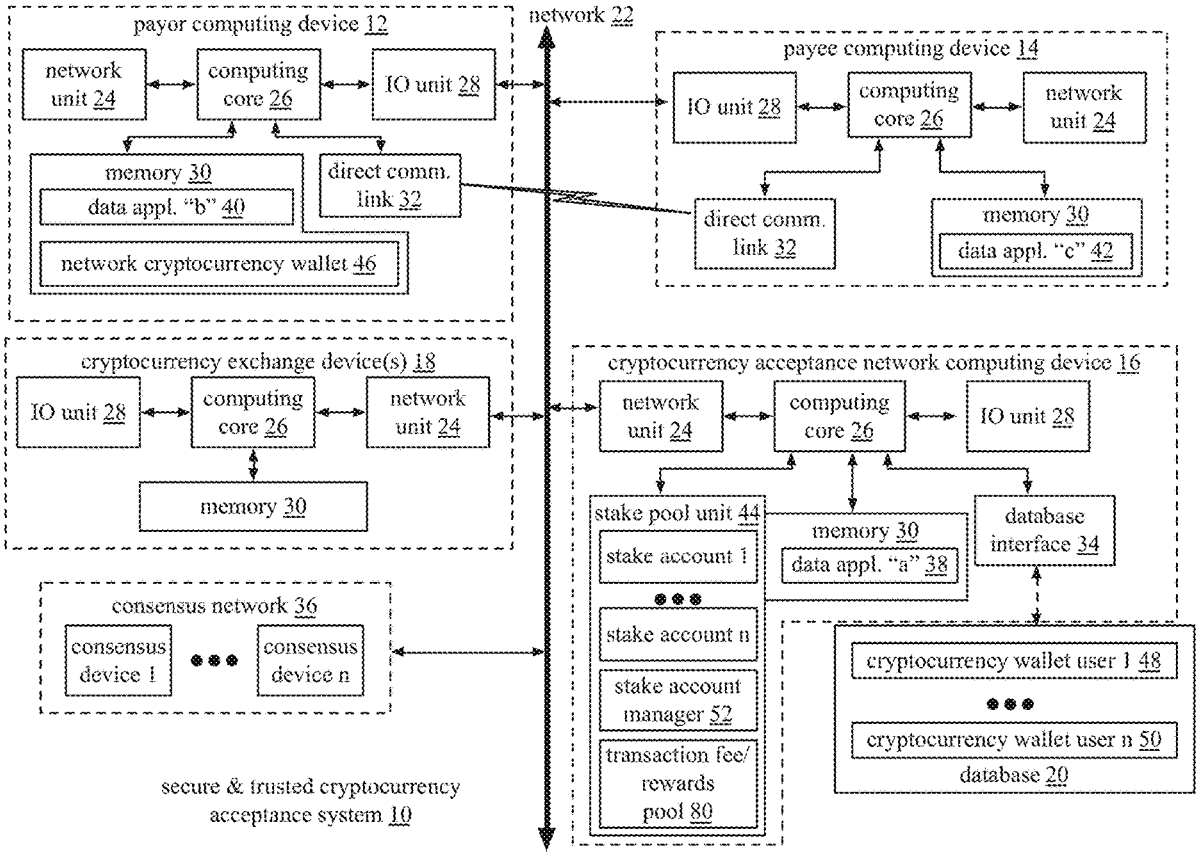
G06Q 20/36	(2006.01)
G06Q 20/22	(2006.01)

(52) **U.S. Cl.**

CPC ***G06Q 20/381*** (2013.01); ***G06Q 40/04*** (2013.01); ***G06Q 20/0655*** (2013.01); *G06Q 20/10* (2013.01); ***G06Q 20/223*** (2013.01); *G06Q 2220/00* (2013.01); ***G06Q 20/3678*** (2013.01)

(57) **ABSTRACT**

A cryptocurrency acceptance network computing device includes a processing module operable to obtain a request to facilitate a cryptocurrency-based payment between a payor computing device and a payee computing device. The payor computing device uses a first cryptocurrency recognized by a first cryptocurrency exchange computing device, and the payee computing device accepts a desired currency recognized by a second cryptocurrency exchange computing device. The processing module is operable to place a hold on an amount of collateral cryptocurrency, determine whether the first cryptocurrency exchange computing device recognizes the desired currency or whether the second cryptocurrency exchange computing device recognizes the first cryptocurrency, and if either is not recognized, the processing module connects to the first cryptocurrency exchange computing device to exchange the first cryptocurrency to a universally accepted cryptocurrency, connects to the second cryptocurrency exchange computing device to exchange the universally accepted cryptocurrency to the desired currency.



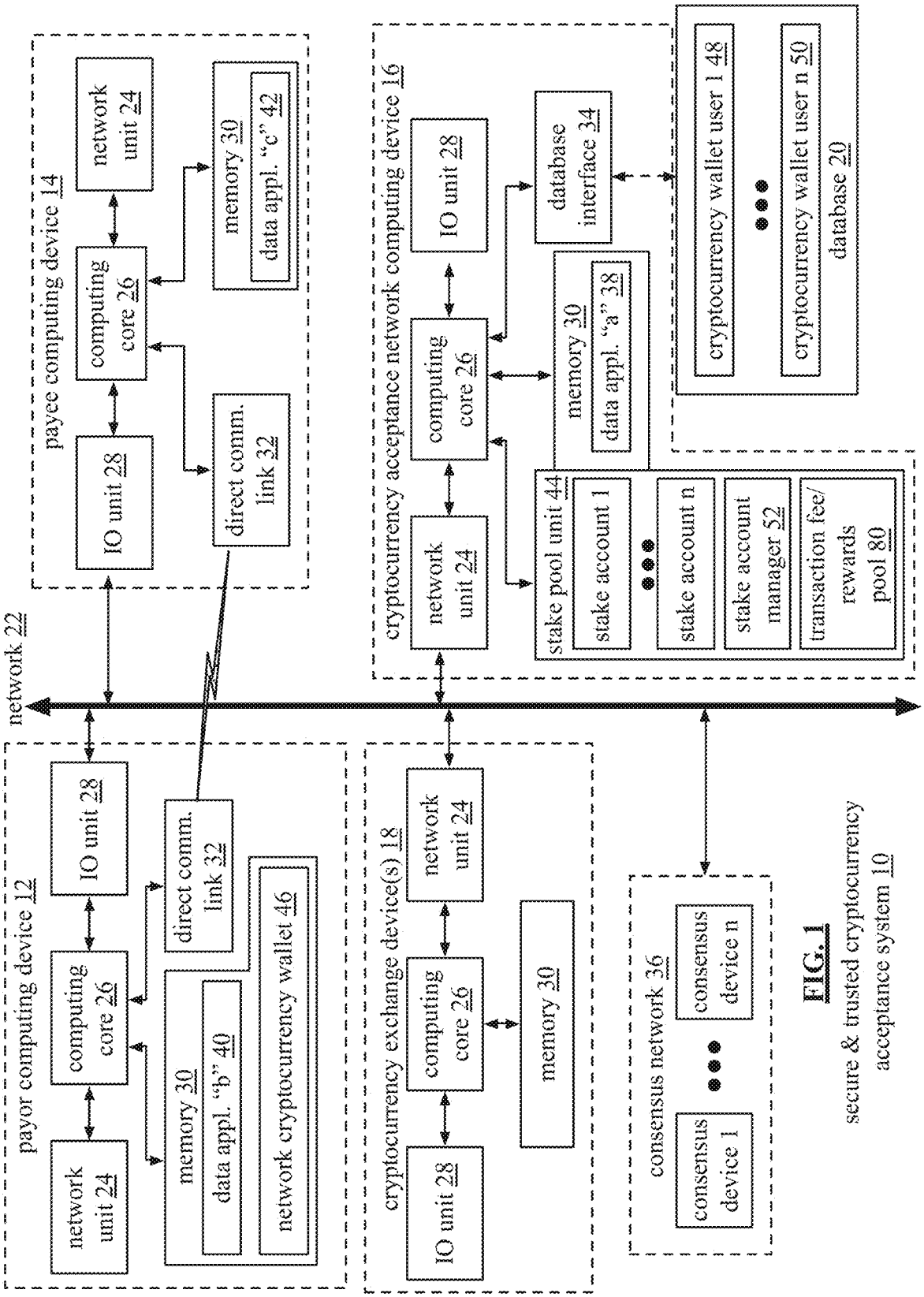


FIG. 1
secure & trusted cryptocurrency acceptance system 10

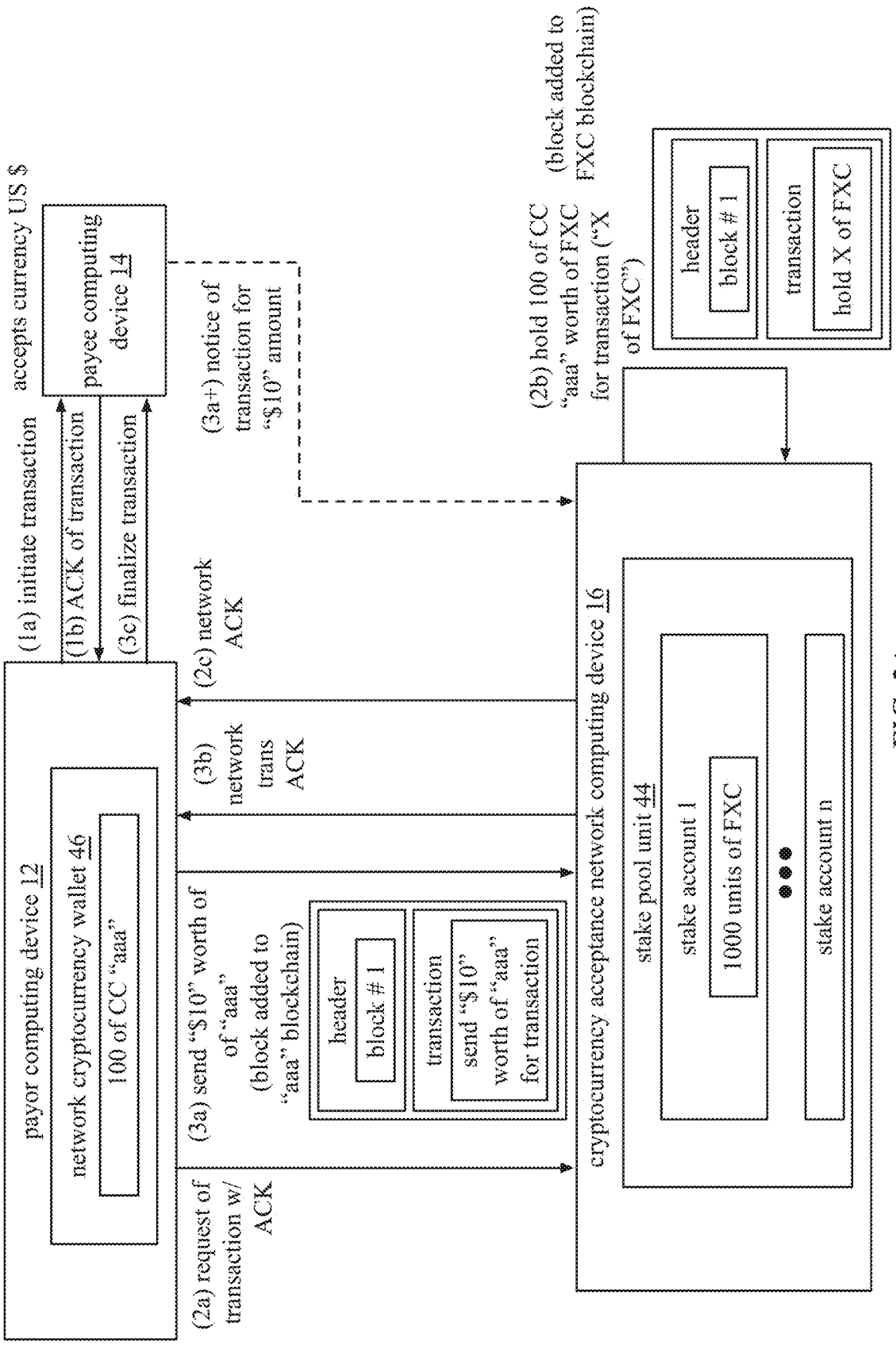

payor computing device 12
network cryptocurrency wallet 46
100 of CC "aaa"
(1a) initiate transaction
(1b) ACK of transaction
(3c) finalize transaction
accepts currency US $
payee computing device 14
(3a+) notice of transaction for "$10" amount
(2a) request of transaction w/ ACK
(3a) send "$10" worth of of "aaa" (block added to "aaa" blockchain)
header
block # 1
transaction
send "$10" worth of "aaa" for transaction
(2c) network ACK
(3b) network trans ACK
(2b) hold 100 of CC "aaa" worth of FXC for transaction ("X of FXC")
(block added to FXC blockchain)
header
block # 1
transaction
hold X of FXC
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n

FIG. 2A

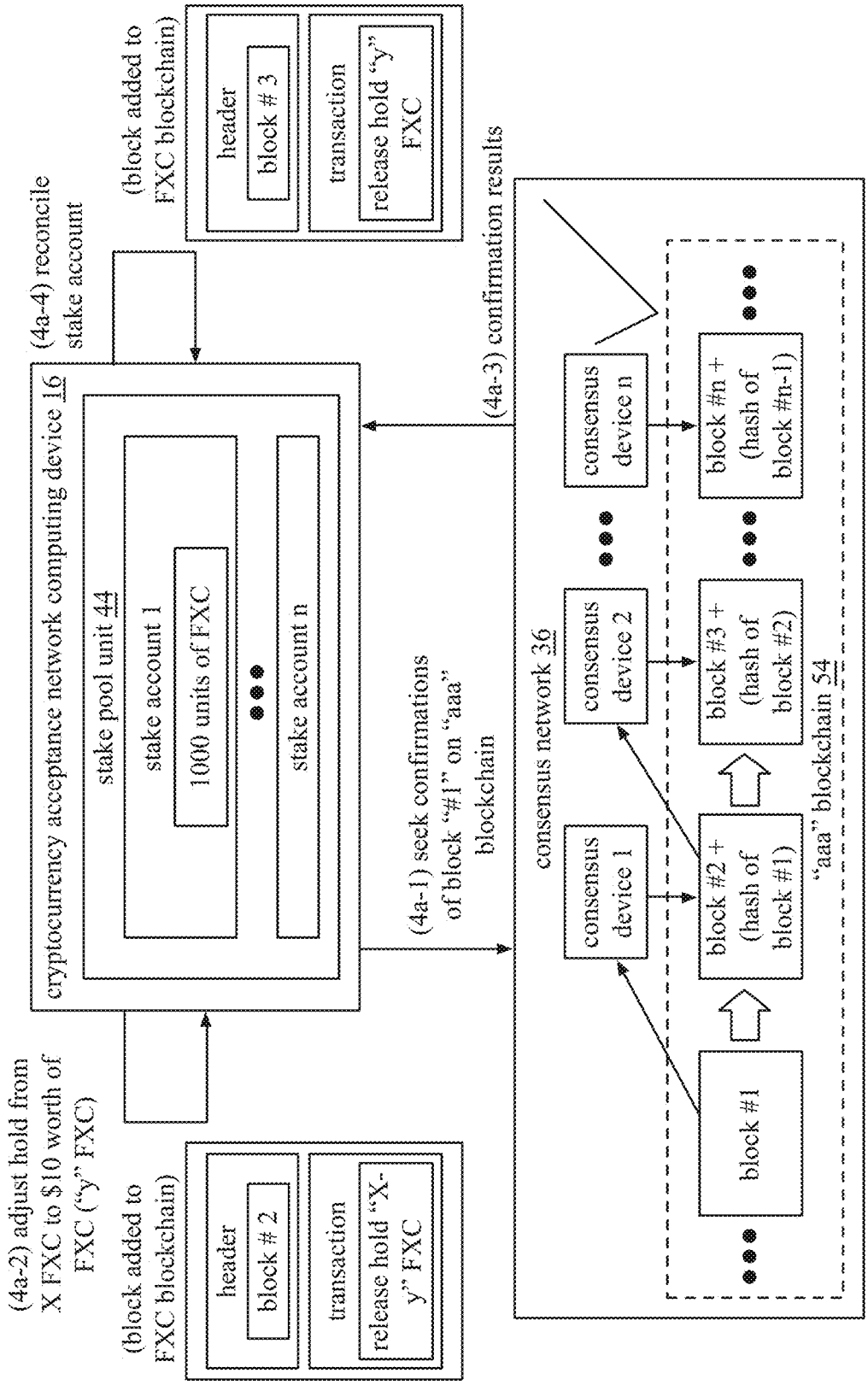

(4a-2) adjust hold from X FXC to $10 worth of FXC ("y" FXC)
(block added to FXC blockchain)
header
block # 2
transaction
release hold "X-y" FXC
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n
(4a-4) reconcile stake account
(block added to FXC blockchain)
header
block # 3
transaction
release hold "y" FXC
(4a-1) seek confirmations of block "#1" on "aaa" blockchain
(4a-3) confirmation results
consensus network 36
consensus device 1
consensus device 2
consensus device n
block #1
block #2 + (hash of block #1)
block #3 + (hash of block #2)
block #n + (hash of block #n-1)
"aaa" blockchain 54

FIG. 2B

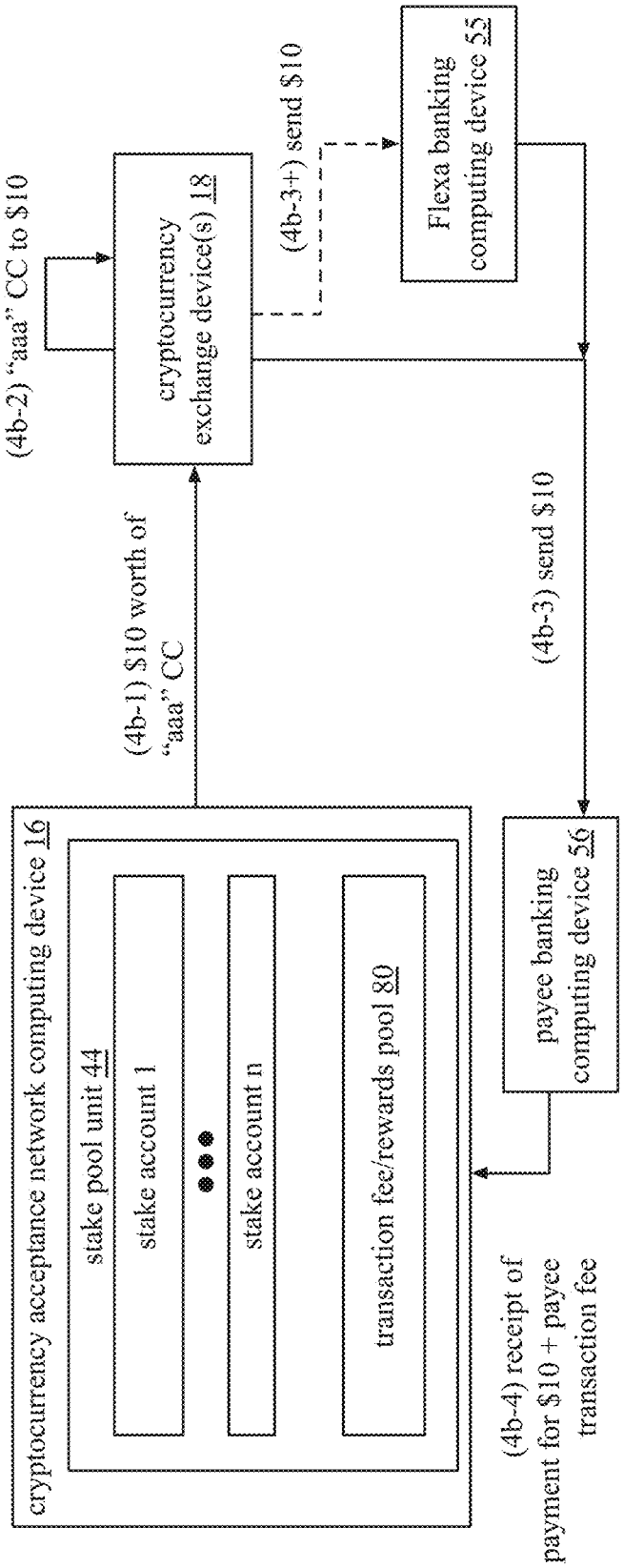

(4b-2) "aaa" CC to $10
cryptocurrency exchange device(s) 18
(4b-3+) send $10
Flexa banking computing device 55
(4b-1) $10 worth of "aaa" CC
(4b-3) send $10
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
stake account n
transaction fee/rewards pool 80
payee banking computing device 56
(4b-4) receipt of payment for $10 + payee transaction fee

FIG. 2C

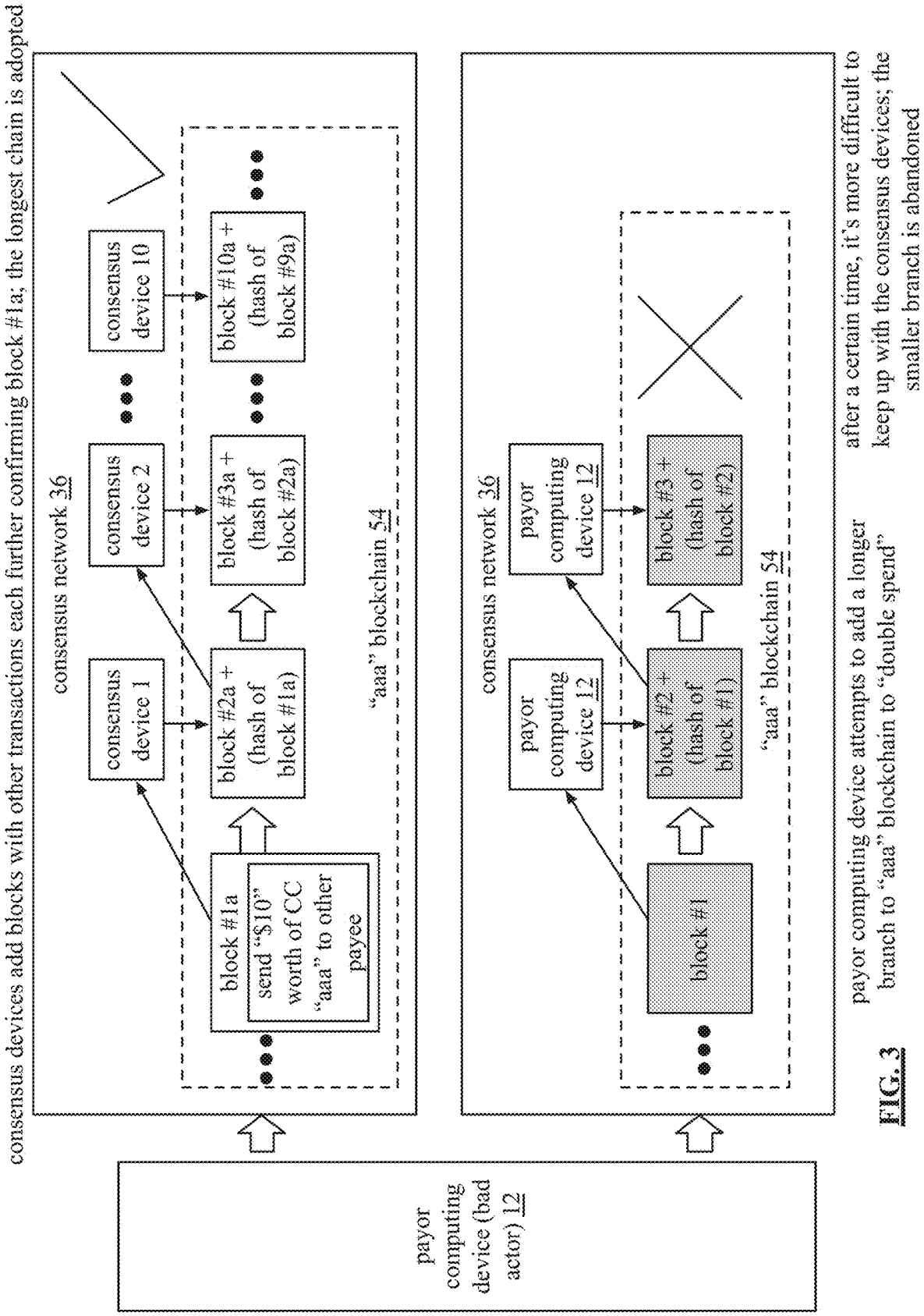

consensus devices add blocks with other transactions each further confirming block #1a; the longest chain is adopted
consensus network 36
consensus device 1
consensus device 2
consensus device 10
block #1a
send "$10" worth of CC "aaa" to other payee
block #2a + (hash of block #1a)
block #3a + (hash of block #2a)
block #10a + (hash of block #9a)
"aaa" blockchain 54
payor computing device (bad actor) 12
consensus network 36
payor computing device 12
payor computing device 12
block #1
block #2 + (hash of block #1)
block #3 + (hash of block #2)
"aaa" blockchain 54
payor computing device attempts to add a longer branch to "aaa" blockchain to "double spend"
after a certain time, it's more difficult to keep up with the consensus devices; the smaller branch is abandoned

FIG. 3

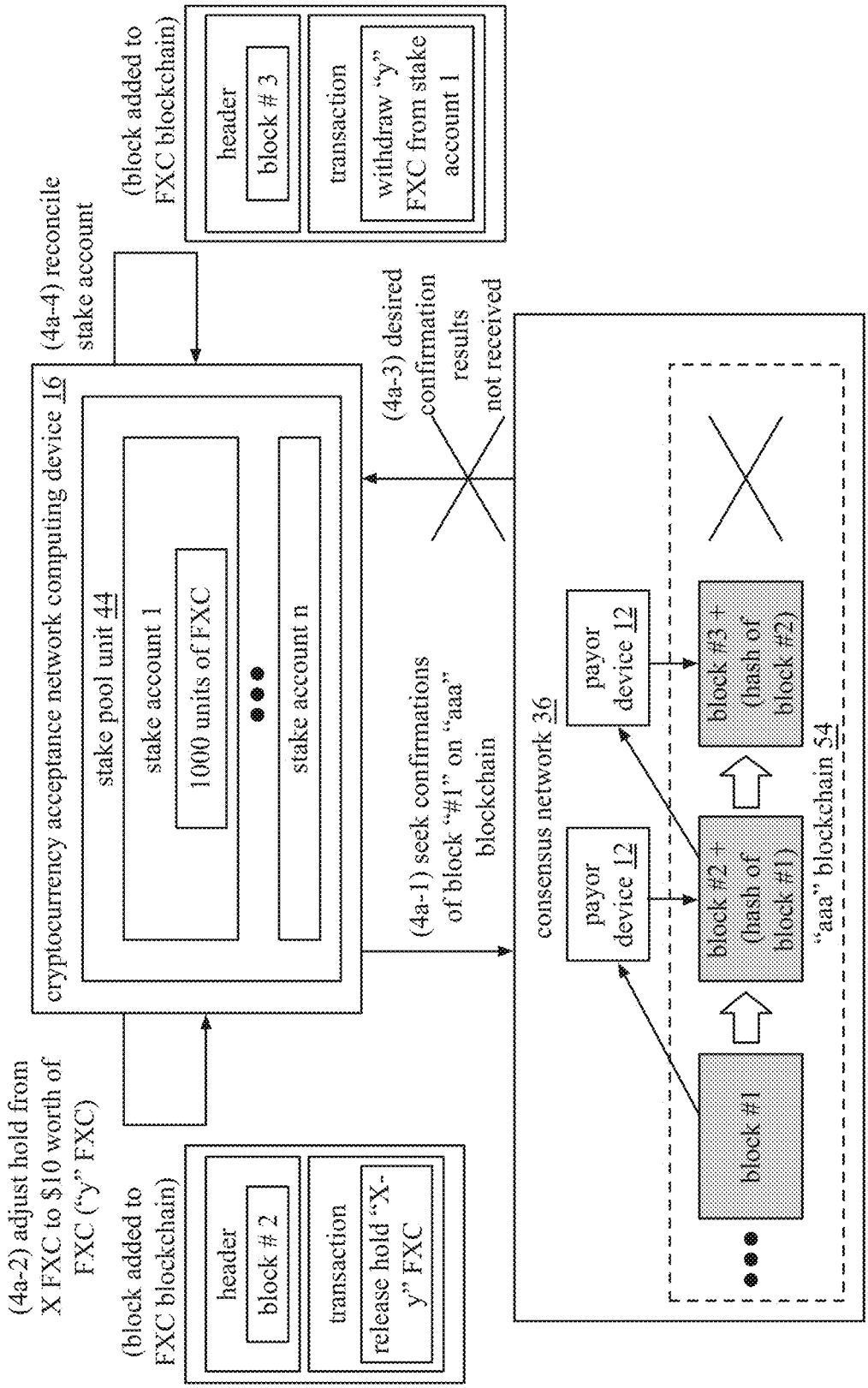

(4a-2) adjust hold from X FXC to $10 worth of FXC ("y" FXC)
(block added to FXC blockchain)
header
block # 2
transaction
release hold "X-y" FXC
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n
(4a-4) reconcile stake account
(block added to FXC blockchain)
header
block # 3
transaction
withdraw "y" FXC from stake account 1
(4a-1) seek confirmations of block "#1" on "aaa" blockchain
(4a-3) desired confirmation results not received
consensus network 36
payor device 12
payor device 12
block #1
block #2 + (hash of block #1)
block #3 + (hash of block #2)
"aaa" blockchain 54

FIG. 4

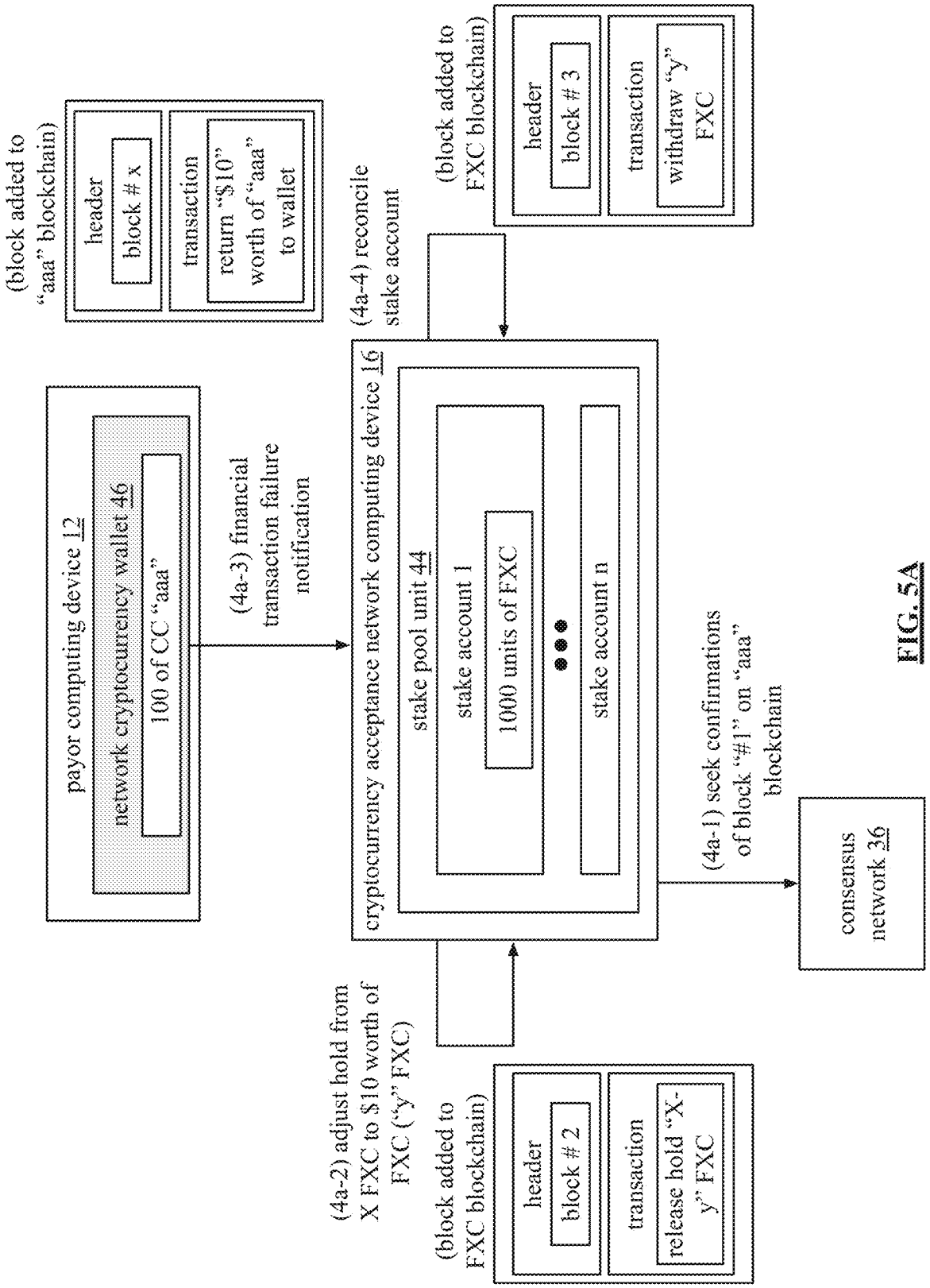

(block added to "aaa" blockchain)
header
block # x
transaction
return "$10" worth of "aaa" to wallet
payor computing device 12
network cryptocurrency wallet 46
100 of CC "aaa"
(4a-3) financial transaction failure notification
(4a-4) reconcile stake account
(block added to FXC blockchain)
header
block # 3
transaction
withdraw "y" FXC
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n
(4a-1) seek confirmations of block "#1" on "aaa" blockchain
consensus network 36
(4a-2) adjust hold from X FXC to $10 worth of FXC ("y" FXC)
(block added to FXC blockchain)
header
block # 2
transaction
release hold "X-y" FXC

FIG. 5A

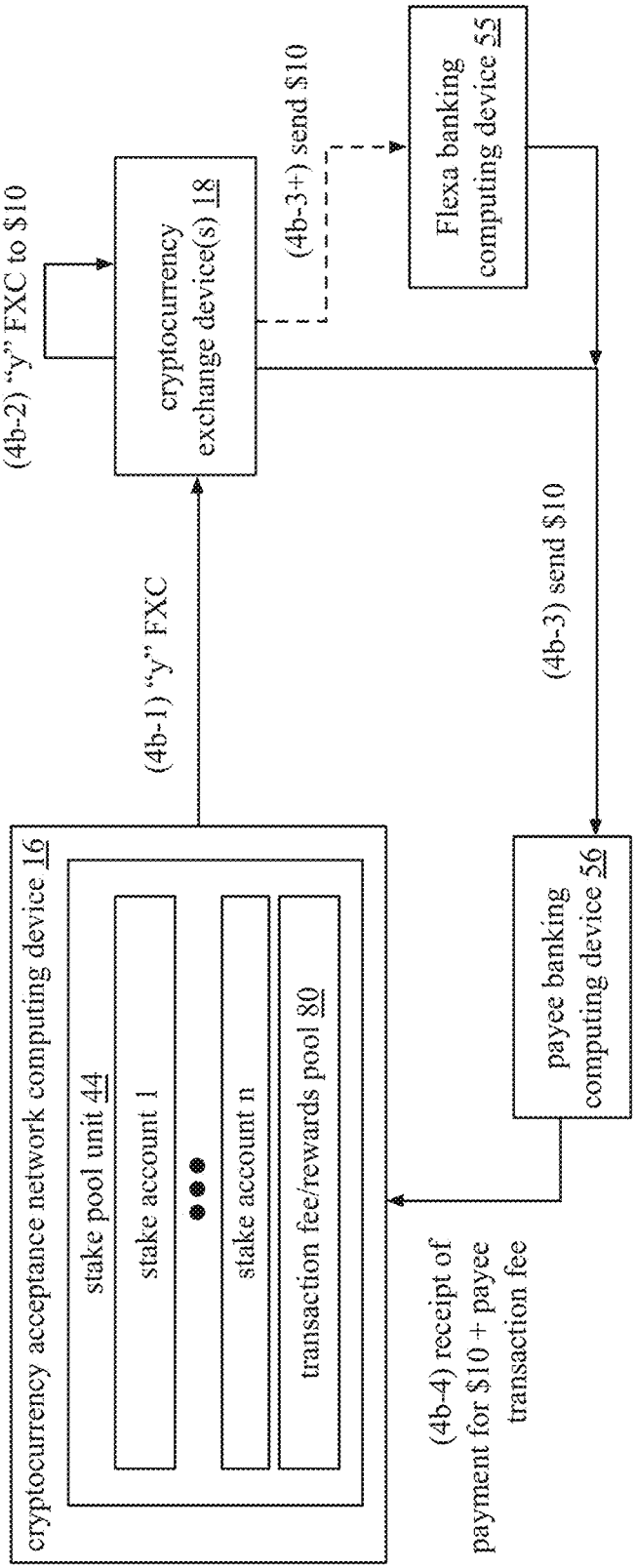

(4b-2) "y" FXC to $10
cryptocurrency exchange device(s) 18
(4b-3+) send $10
Flexa banking computing device 55
(4b-1) "y" FXC
(4b-3) send $10
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
stake account n
transaction fee/rewards pool 80
payee banking computing device 56
(4b-4) receipt of payment for $10 + payee transaction fee

FIG. 5B

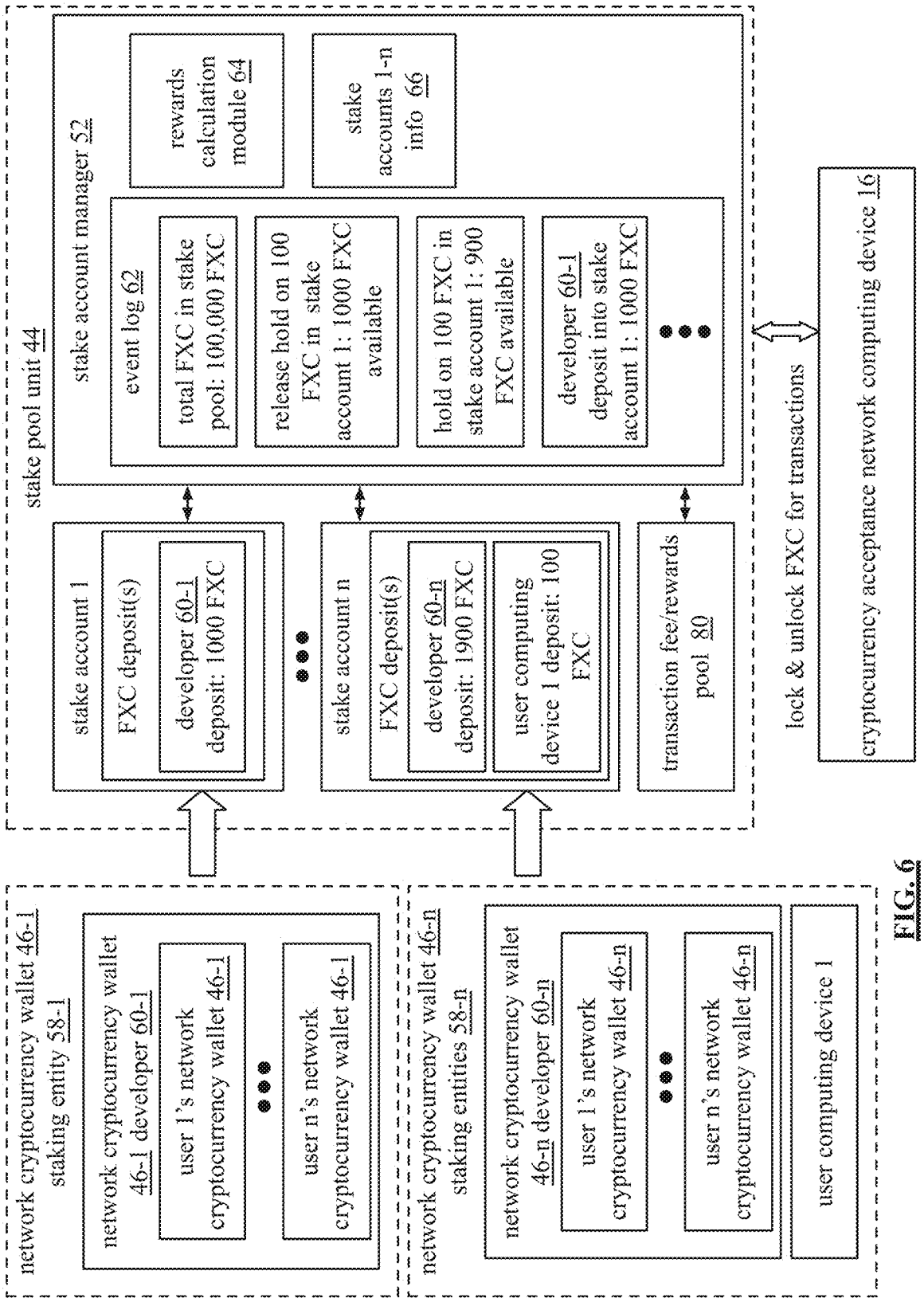

stake pool unit 44
stake account manager 52
rewards calculation module 64
stake accounts 1-n info 66
event log 62
total FXC in stake pool: 100,000 FXC
release hold on 100 FXC in stake account 1: 1000 FXC available
hold on 100 FXC in stake account 1: 900 FXC available
developer 60-1 deposit into stake account 1: 1000 FXC
stake account 1
FXC deposit(s)
developer 60-1 deposit: 1000 FXC
stake account n
FXC deposit(s)
developer 60-n deposit: 1900 FXC
user computing device 1 deposit: 100 FXC
transaction fee/rewards pool 80
lock & unlock FXC for transactions
cryptocurrency acceptance network computing device 16
network cryptocurrency wallet 46-1 staking entity 58-1
network cryptocurrency wallet 46-1 developer 60-1
user 1's network cryptocurrency wallet 46-1
user n's network cryptocurrency wallet 46-1
network cryptocurrency wallet 46-n staking entities 58-n
network cryptocurrency wallet 46-n developer 60-n
user 1's network cryptocurrency wallet 46-n
user n's network cryptocurrency wallet 46-n
user computing device 1

FIG. 6

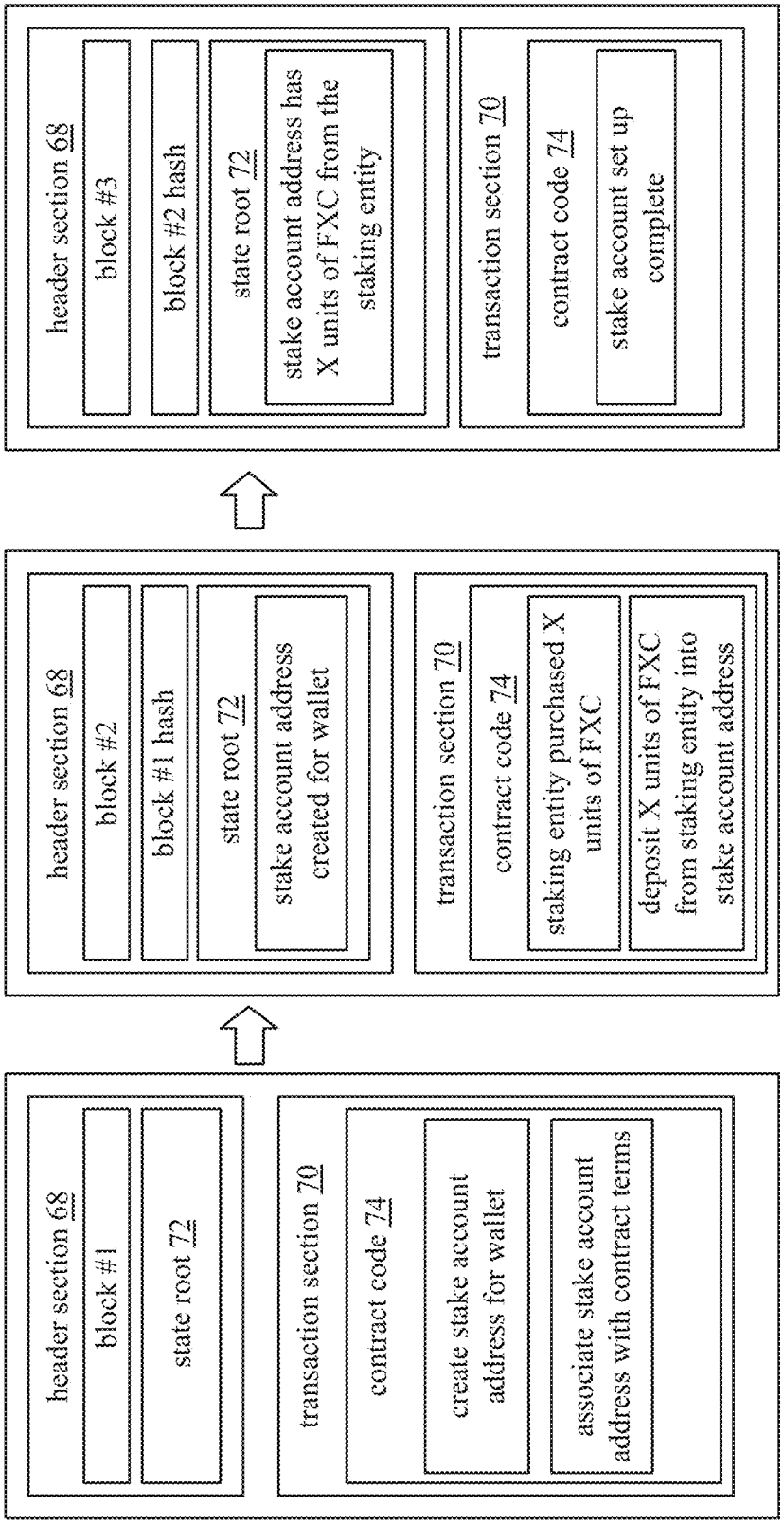

header section 68
block #1
state root 72
transaction section 70
contract code 74
create stake account address for wallet
associate stake account address with contract terms
header section 68
block #2
block #1 hash
state root 72
stake account address created for wallet
transaction section 70
contract code 74
staking entity purchased X units of FXC
deposit X units of FXC from staking entity into stake account address
header section 68
block #3
block #2 hash
state root 72
stake account address has X units of FXC from the staking entity
transaction section 70
contract code 74
stake account set up complete

FIG. 7

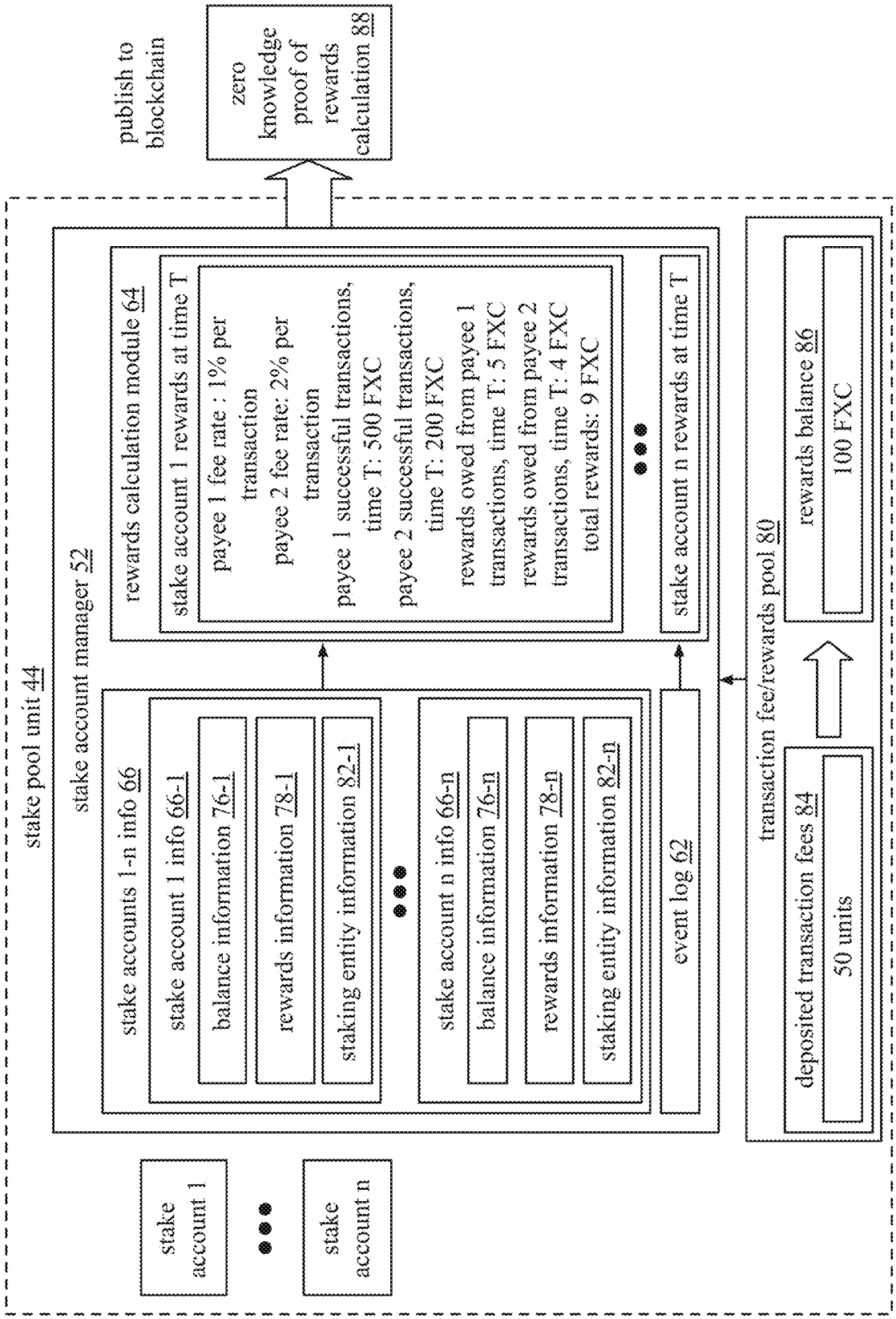

stake pool unit 44
stake account manager 52
stake accounts 1-n info 66
stake account 1 info 66-1
balance information 76-1
rewards information 78-1
staking entity information 82-1
stake account n info 66-n
balance information 76-n
rewards information 78-n
staking entity information 82-n
event log 62
rewards calculation module 64
stake account 1 rewards at time T
payee 1 fee rate : 1% per transaction
payee 2 fee rate: 2% per transaction
payee 1 successful transactions, time T: 500 FXC
payee 2 successful transactions, time T: 200 FXC
rewards owed from payee 1 transactions, time T: 5 FXC
rewards owed from payee 2 transactions, time T: 4 FXC
total rewards: 9 FXC
stake account n rewards at time T
publish to blockchain
zero knowledge proof of rewards calculation 88
transaction fee/rewards pool 80
deposited transaction fees 84
50 units
rewards balance 86
100 FXC
stake account 1
stake account n

FIG. 8

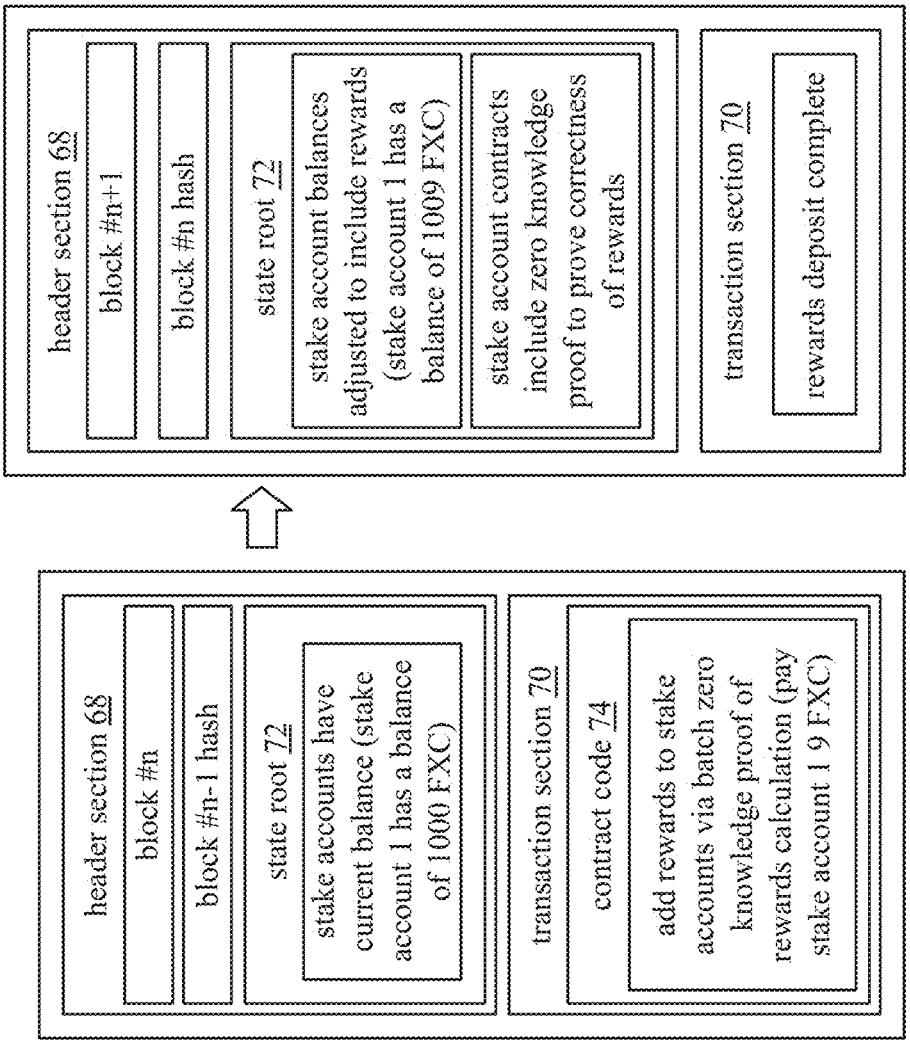

header section 68
block #n
block #n-1 hash
state root 72
stake accounts have current balance (stake account 1 has a balance of 1000 FXC)
transaction section 70
contract code 74
add rewards to stake accounts via batch zero knowledge proof of rewards calculation (pay stake account 1 9 FXC)
header section 68
block #n+1
block #n hash
state root 72
stake account balances adjusted to include rewards (stake account 1 has a balance of 1009 FXC)
stake account contracts include zero knowledge proof to prove correctness of rewards
transaction section 70
rewards deposit complete

FIG. 9

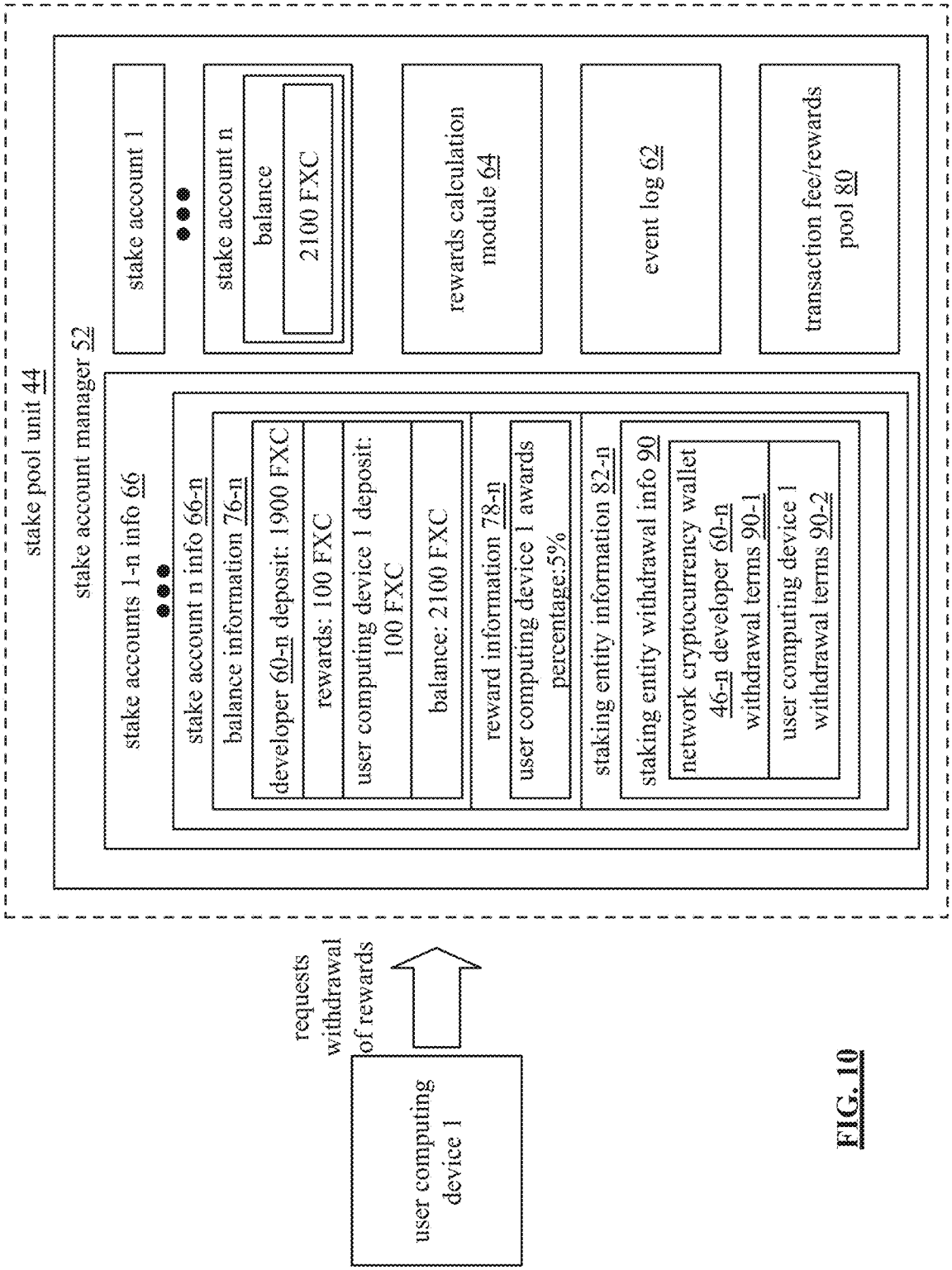

stake pool unit 44
stake account manager 52
stake accounts 1-n info 66
stake account n info 66-n
balance information 76-n
developer 60-n deposit: 1900 FXC
rewards: 100 FXC
user computing device 1 deposit: 100 FXC
balance: 2100 FXC
reward information 78-n
user computing device 1 awards percentage:5%
staking entity information 82-n
staking entity withdrawal info 90
network cryptocurrency wallet 46-n developer 60-n withdrawal terms 90-1
user computing device 1 withdrawal terms 90-2
stake account 1
stake account n
balance
2100 FXC
rewards calculation module 64
event log 62
transaction fee/rewards pool 80
requests withdrawal of rewards
user computing device 1

FIG. 10

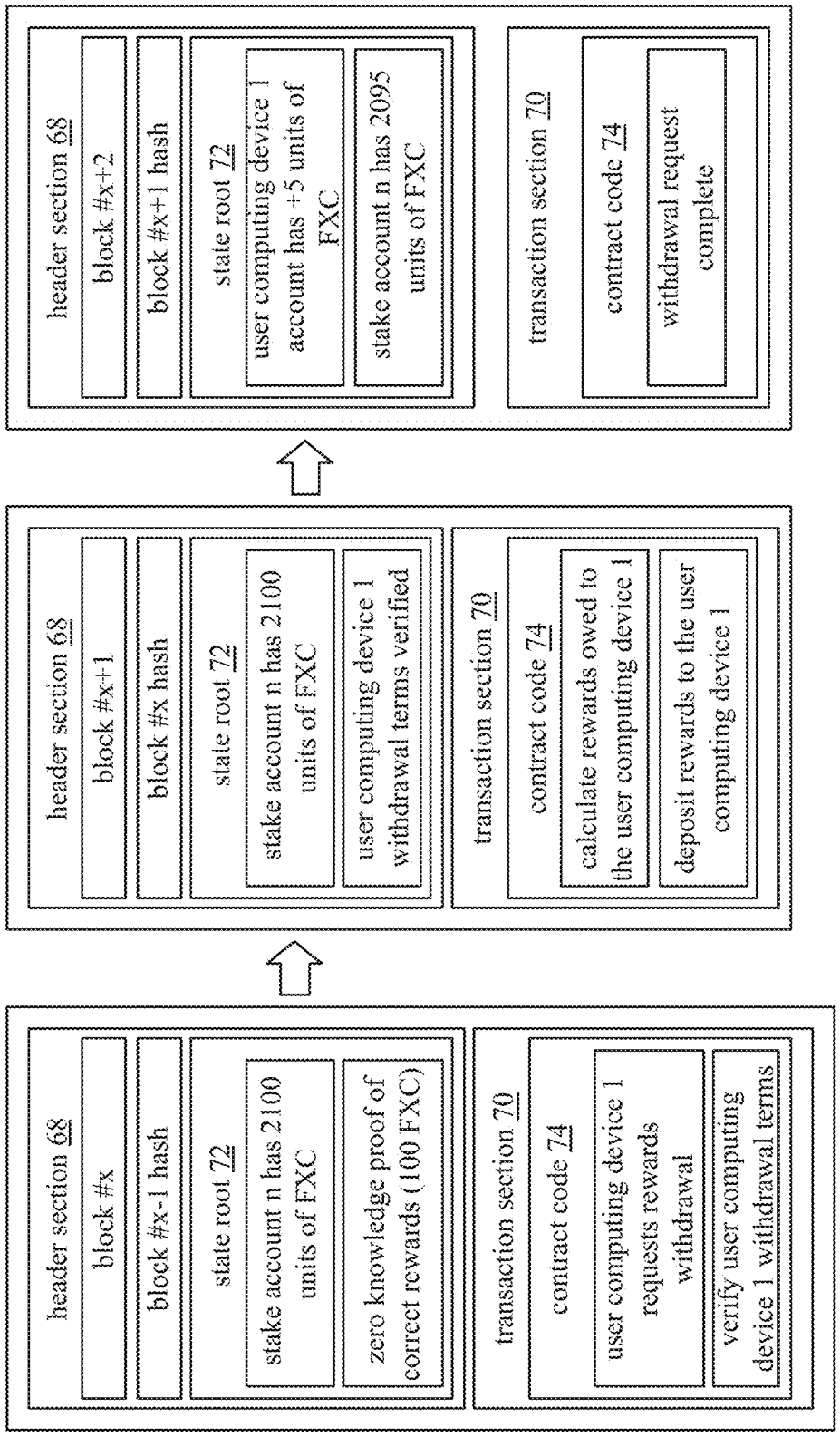

header section 68
block #x
block #x-1 hash
state root 72
stake account n has 2100 units of FXC
zero knowledge proof of correct rewards (100 FXC)
transaction section 70
contract code 74
user computing device 1 requests rewards withdrawal
verify user computing device 1 withdrawal terms
header section 68
block #x+1
block #x hash
state root 72
stake account n has 2100 units of FXC
user computing device 1 withdrawal terms verified
transaction section 70
contract code 74
calculate rewards owed to the user computing device 1
deposit rewards to the user computing device 1
header section 68
block #x+2
block #x+1 hash
state root 72
user computing device 1 account has +5 units of FXC
stake account n has 2095 units of FXC
transaction section 70
contract code 74
withdrawal request complete

FIG. 11

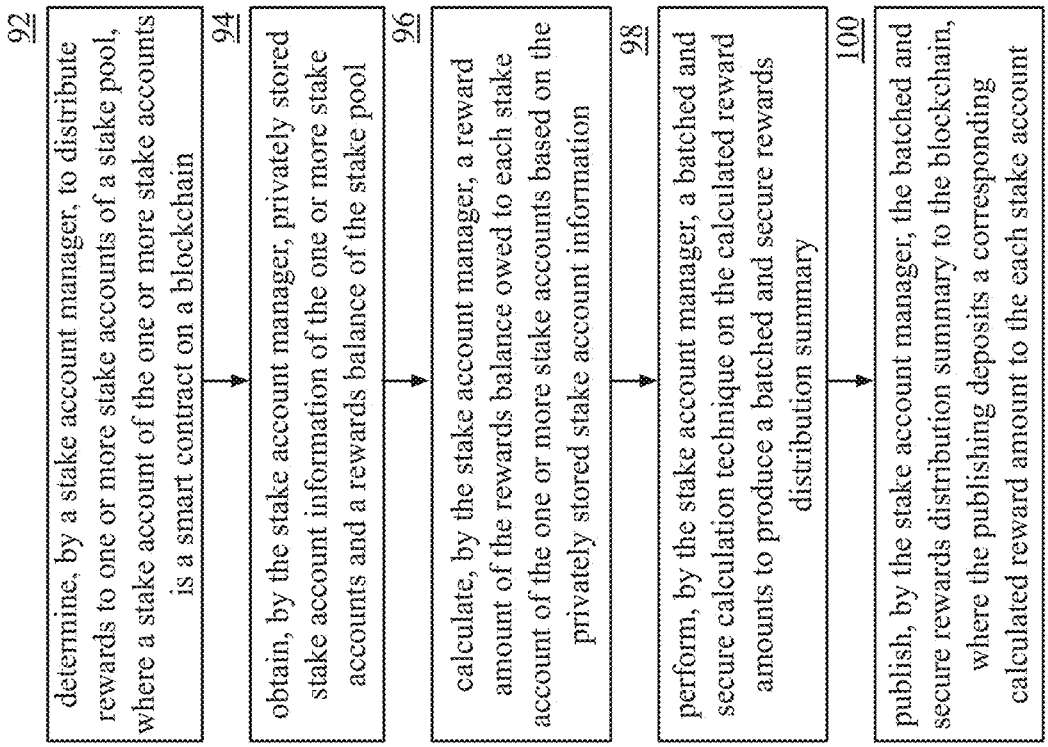

92
determine, by a stake account manager, to distribute rewards to one or more stake accounts of a stake pool, where a stake account of the one or more stake accounts is a smart contract on a blockchain
94
obtain, by the stake account manager, privately stored stake account information of the one or more stake accounts and a rewards balance of the stake pool
96
calculate, by the stake account manager, a reward amount of the rewards balance owed to each stake account of the one or more stake accounts based on the privately stored stake account information
98
perform, by the stake account manager, a batched and secure calculation technique on the calculated reward amounts to produce a batched and secure rewards distribution summary
100
publish, by the stake account manager, the batched and secure rewards distribution summary to the blockchain, where the publishing deposits a corresponding calculated reward amount to the each stake account

FIG. 12

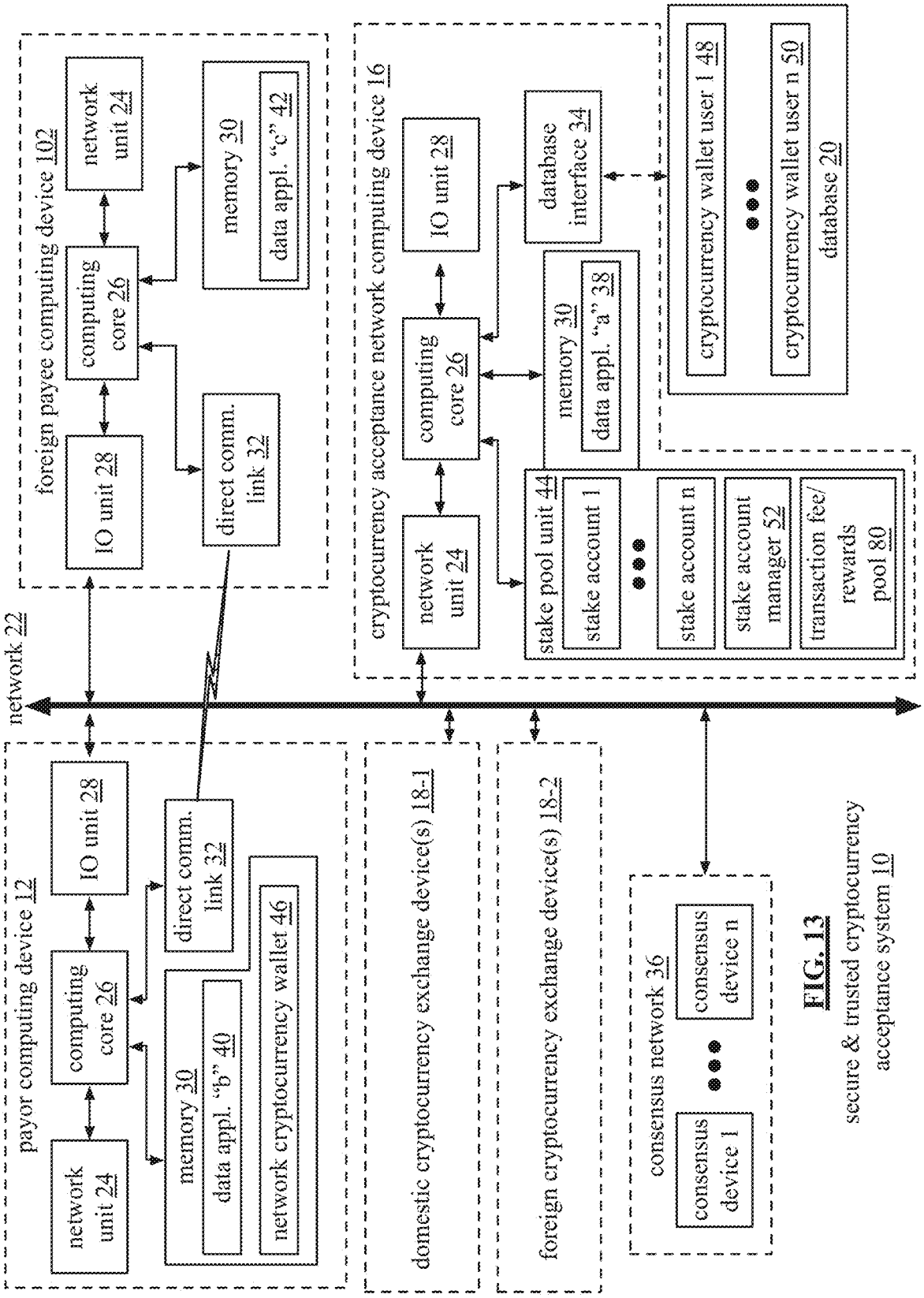


FIG. 13
secure & trusted cryptocurrency acceptance system 10

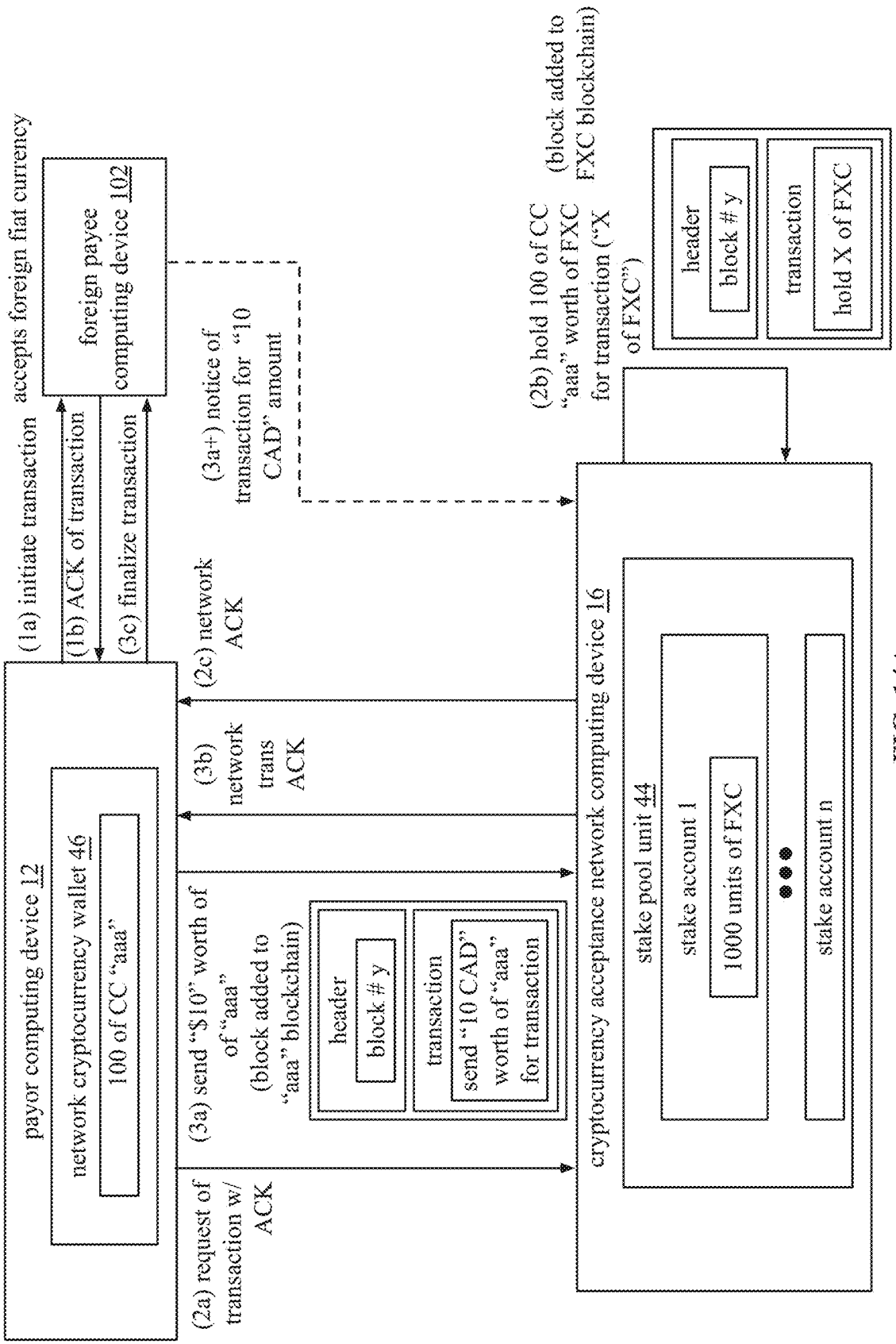

payor computing device 12
network cryptocurrency wallet 46
100 of CC "aaa"
(1a) initiate transaction
(1b) ACK of transaction
(3c) finalize transaction
accepts foreign fiat currency
foreign payee computing device 102
(2a) request of transaction w/ ACK
(3a) send "$10" worth of of "aaa" (block added to "aaa" blockchain)
header
block # y
transaction
send "10 CAD" worth of "aaa" for transaction
(3b) network trans ACK
(2c) network ACK
(3a+) notice of transaction for "10 CAD" amount
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n
(2b) hold 100 of CC "aaa" worth of FXC for transaction ("X of FXC")
(block added to FXC blockchain)
header
block # y
transaction
hold X of FXC

FIG. 14A

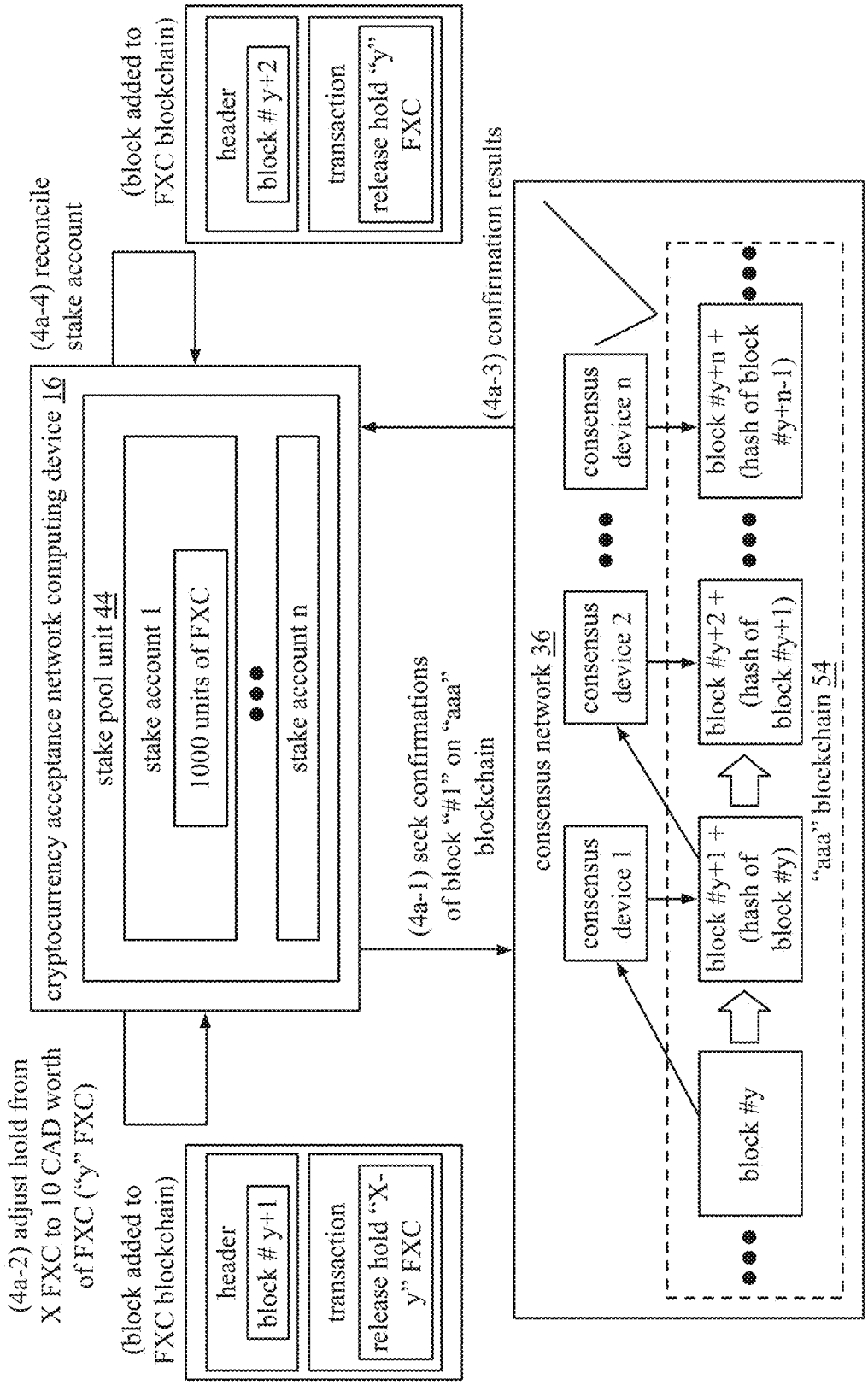

(4a-2) adjust hold from X FXC to 10 CAD worth of FXC ("y" FXC)
(block added to FXC blockchain)
header
block # y+1
transaction
release hold "X-y" FXC
cryptocurrency acceptance network computing device 16
stake pool unit 44
stake account 1
1000 units of FXC
stake account n
(4a-4) reconcile stake account
(block added to FXC blockchain)
header
block # y+2
transaction
release hold "y" FXC
(4a-1) seek confirmations of block "#1" on "aaa" blockchain
(4a-3) confirmation results
consensus network 36
consensus device 1
consensus device 2
consensus device n
block #y
block #y+1 + (hash of block #y)
block #y+2 + (hash of block #y+1)
block #y+n + (hash of block #y+n-1)
"aaa" blockchain 54

FIG. 14B

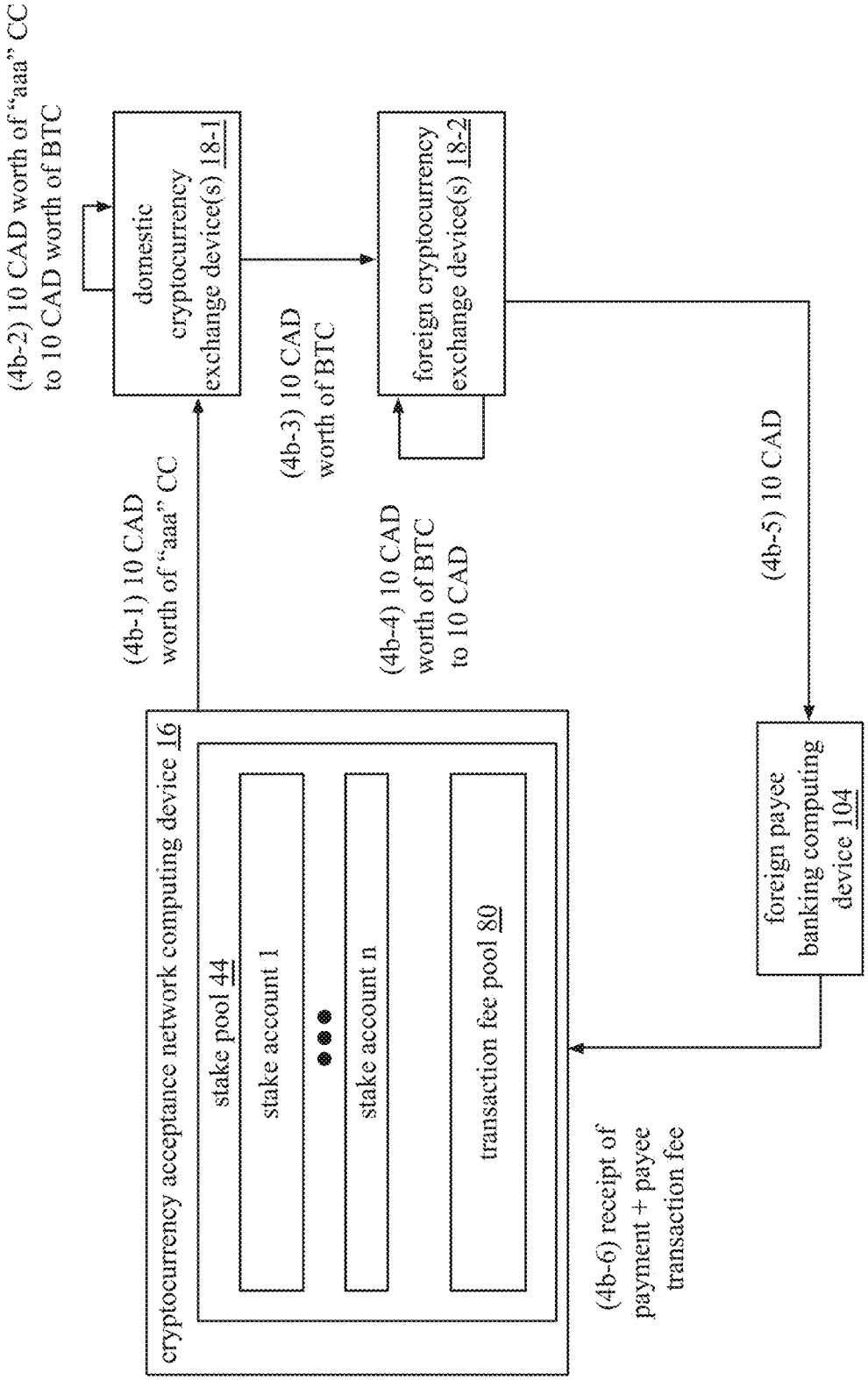

(4b-2) 10 CAD worth of "aaa" CC to 10 CAD worth of BTC
domestic cryptocurrency exchange device(s) 18-1
(4b-3) 10 CAD worth of BTC
foreign cryptocurrency exchange device(s) 18-2
(4b-1) 10 CAD worth of "aaa" CC
(4b-4) 10 CAD worth of BTC to 10 CAD
(4b-5) 10 CAD
cryptocurrency acceptance network computing device 16
stake pool 44
stake account 1
stake account n
transaction fee pool 80
foreign payee banking computing device 104
(4b-6) receipt of payment + payee transaction fee

FIG. 14C

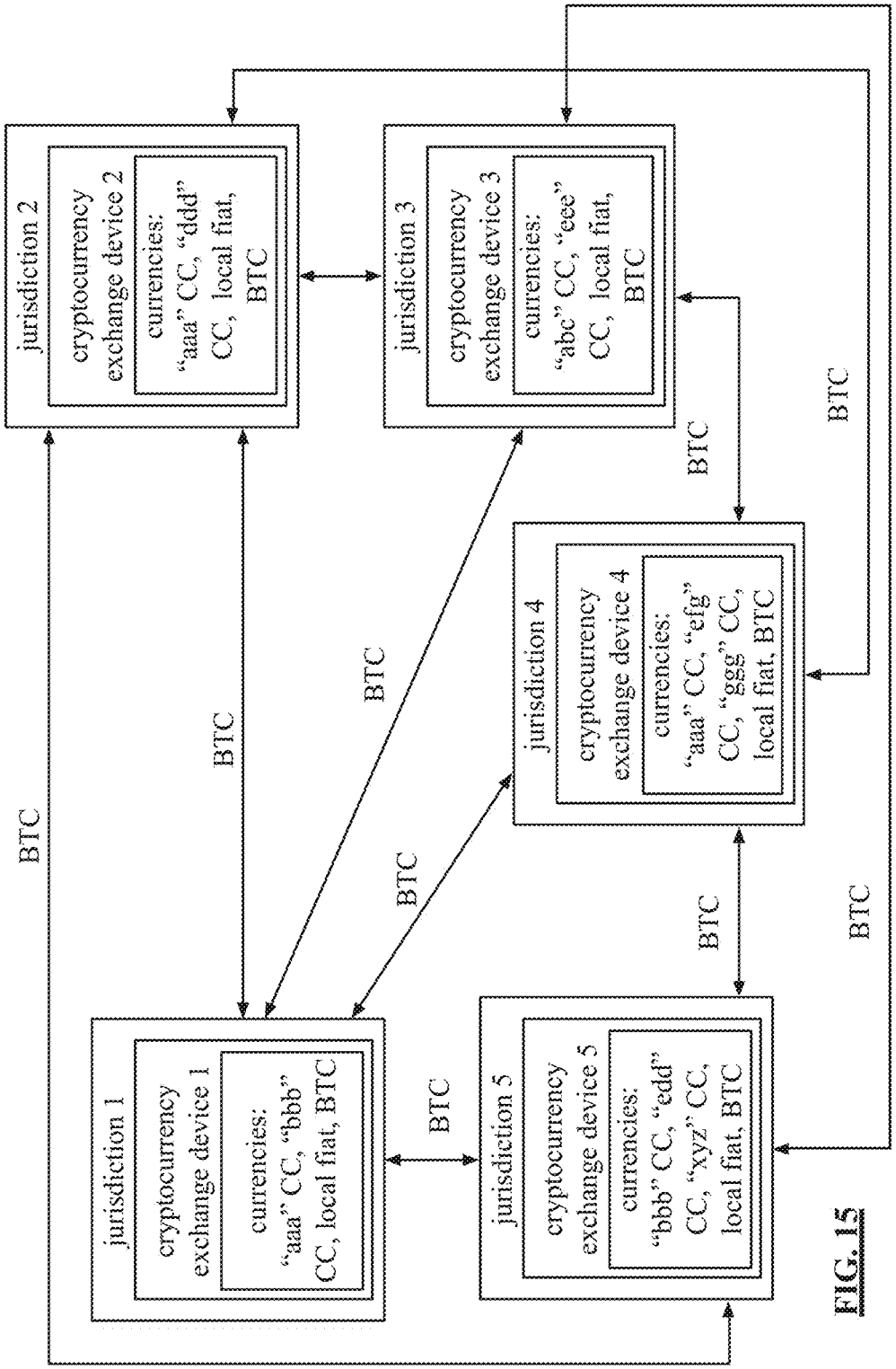

jurisdiction 2
cryptocurrency exchange device 2
currencies: "aaa" CC, "ddd" CC, local fiat, BTC
jurisdiction 3
cryptocurrency exchange device 3
currencies: "abc" CC, "eee" CC, local fiat, BTC
jurisdiction 4
cryptocurrency exchange device 4
currencies: "aaa" CC, "efg" CC, "ggg" CC, local fiat, BTC
jurisdiction 1
cryptocurrency exchange device 1
currencies: "aaa" CC, "bbb" CC, local fiat, BTC
jurisdiction 5
cryptocurrency exchange device 5
currencies: "bbb" CC, "edf" CC, "xyz" CC, local fiat, BTC
BTC

FIG. 15

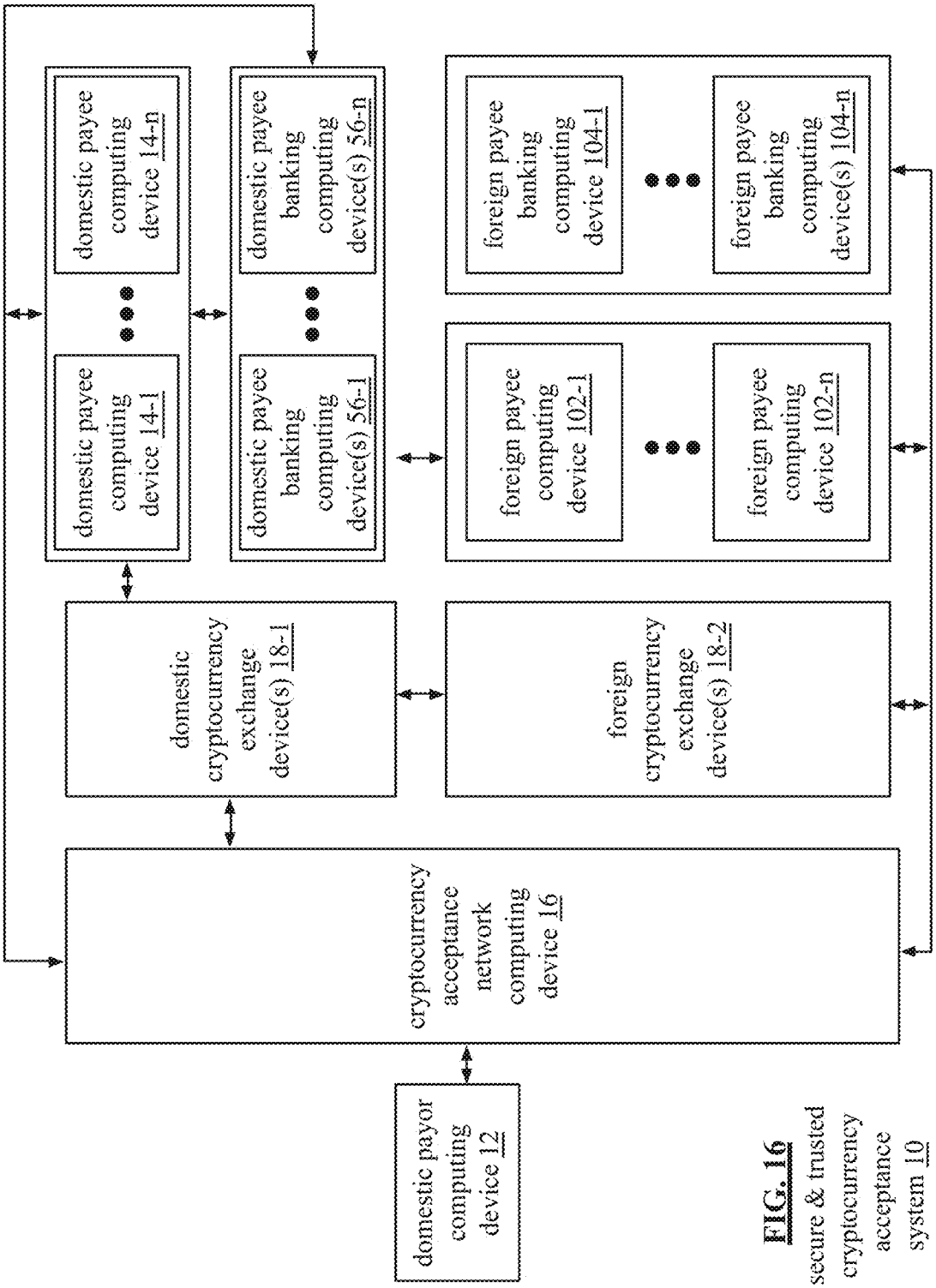


FIG. 16
secure & trusted cryptocurrency acceptance system 10

MULTI-JURISDICTIONAL SECURE AND TRUSTED CRYPTOCURRENCY ACCEPTANCE SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present U.S. Utility patent application claims priority pursuant to 35 U.S.C. § 120 as a continuation of U.S. Utility application Ser. No. 16/695,459, entitled "SECURE AND TRUSTED CRYPTOCURRENY ACCEPTANCE SYSTEM", filed Nov. 26, 2019, which is hereby incorporated herein by reference in its entirety and made part of the present U.S. Utility patent application for all purposes.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

[0003] Not Applicable.

BACKGROUND OF THE INVENTION

Technical Field of the Invention

[0004] This invention relates generally to secure and trusted financial transactions involving cryptocurrency and more particularly to a secure and trusted cryptocurrency acceptance system.

Description of Related Art

[0005] Current payment systems are vulnerable to security breaches, fraud, and identity theft. A typical payment card transaction with a merchant involves several steps (e.g., card authorization, clearing, and settlement) and the participation of various entities (e.g., financial institutions, credit card companies, and a payment processing networks). Each step and each entity has its own varying security problems (e.g., hacking).

[0006] The steps involved are also inconvenient, time consuming, and expensive. For example, card authorization (e.g., credit or debit card authorization) begins with the cardholder presenting the card to a merchant for goods or service. The card is issued by a particular financial institution (e.g., a bank) and is associated with a credit card company (e.g., Visa, Mastercard, etc.). The merchant uses a credit card machine, software, or gateway to transmit transaction data to their acquiring bank (or its processor). The acquiring bank routes the transaction data to a payment processing network and the payment processing network sends the transaction data to the cardholder's issuing bank. The issuing bank validates that the card has not been reported stolen or lost, confirms whether funds are available, and sends a response code back through the payment processing network to the acquiring bank as to whether the transaction is approved.

[0007] The transaction data typically includes the card number, transaction amount, date, merchant's name, merchant's location, merchant category code, and an encrypted personal identification number (PIN) if entered. The response code reaches the merchant's terminal and is stored in a file until it is settled. The merchant sends the stored, approved transactions to its acquiring back (e.g., at the end of the day) and the acquiring bank reconciles and transmits approved transactions through the appropriate card-processing network. The acquiring bank deposits funds from sales into the merchant's account. The payment processing network debits the issuing bank account and credits the acquiring bank account for the amount of the transaction.

[0008] Merchants pay substantial credit card processing fees and those costs are passed along to consumers. Most merchants pay an interchange rate on a total transaction and a flat fee to the credit card company involved (e.g., Visa, Mastercard, etc.). Rates vary based on the credit card company, the credit card type (e.g., credit, debit, business, etc.), processing type (e.g., online payment, swiped, through a mobile device, card not present, etc.), and a Merchant Category Code (MCC) that classifies a merchant's type of business. Further, merchants typically pay a commission and a flat fee to the payment processing network.

[0009] Mobile wallet applications allow cardholders to store card data on a computing device via a digital wallet for convenient transactions. For example, some mobile wallet apps use near field communication (NFC) for contactless payments (e.g., exchange of data by holding device over a payment reader). NFC chips are specifically designed to manage financial security and only store data needed to initiate and complete a transaction. Mobile wallets use types of tokenization to assign a device account number (DAN) in place of an account or card number so that the DAN is passed to the merchant rather than the actual account/card number. As another security measure, digital wallets rely on digital certificates to verify identity. However, using a digital wallet on a device means data passes through not only the device's hardware and operating system but then also a specific payment app, and then finally the source of payment. Further, user fraud via mobile wallets is possible.

[0010] Distributed ledger technology (e.g., a blockchain) reduces the risk of fraudulent activity. For example, a blockchain is an immutable ledger for recording transactions within a network, consisting of a continuously growing list of blocks (i.e., groups of transactions) that are securely linked, continually reconciled, and shared among all network participants (i.e., a decentralized network). Transactions are validated and added to blocks via hashing algorithms, and then permanently written to the chain via consensus of the entire network. Once recorded on the blockchain, transactions cannot be altered.

[0011] A cryptocurrency is a digital asset that is securely created and transferred via cryptography. Many cryptocurrencies are distributed networks based on distributed ledger technology (e.g., a blockchain). Decentralized networks like Bitcoin use pseudo-anonymous transactions that are open and public (i.e., anyone can join, create, and view transactions). To minimize fraudulent activity and deter malicious network activity, cryptocurrency transactions can be recorded by "miners" using "proof of work" secure hashing algorithms (SHA-256) that require significant computing power. While many cryptocurrencies are blockchain based, other distributed ledger technologies may be used. For example, asynchronous consensus algorithms enable a network of nodes to communicate with each other and reach consensus in a decentralized manner. This method does not

need miners to validate transactions and uses directed acyclic graphs for time-sequencing transactions without bundling them into blocks.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0012] FIG. **1** is a schematic block diagram of an embodiment of a secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0013] FIGS. **2**A-**2**C are flowcharts of an example of a method of a financial transaction of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0014] FIG. **3** is a schematic block diagram of an example of an attempted fraudulent transaction within the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0015] FIG. **4** is a flowchart of an example of attempted network attack within the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0016] FIGS. **5**A-**5**B are flowcharts of an example of a wallet authorization failure within the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0017] FIG. **6** is a schematic block diagram of an embodiment of a stake pool of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0018] FIG. **7** is a schematic block diagram of an embodiment of a stake account setup in accordance with the present invention;

[0019] FIG. **8** is a schematic block diagram of an embodiment of a stake pool of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0020] FIG. **9** is a schematic block diagram of an example of a rewards distribution to one or more stake accounts in accordance with the present invention;

[0021] FIG. **10** is a schematic block diagram of an embodiment of the stake pool of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0022] FIG. **11** is a schematic block diagram of an "on-chain" stake account withdrawal in accordance with the present invention;

[0023] FIG. **12** is a flowchart of an example of a method of calculating stake account rewards withdrawal in accordance with the present invention;

[0024] FIG. **13** is a schematic block diagram of another embodiment of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0025] FIGS. **14**A-**14**C are flowcharts of an example of a method of a financial transaction of the secure & trusted cryptocurrency acceptance system in accordance with the present invention;

[0026] FIG. **15** is a schematic block diagram of an embodiment of a worldwide network of cryptocurrency exchange devices of the secure & trusted cryptocurrency acceptance system in accordance with the present invention; and

[0027] FIG. **16** is a schematic block diagram of another embodiment of the secure & trusted cryptocurrency acceptance system.

DETAILED DESCRIPTION OF THE INVENTION

[0028] FIG. **1** is a schematic block diagram of an embodiment of a secure & trusted cryptocurrency acceptance system **10** that includes a payor computing device **12**, a payee computing device **14**, a cryptocurrency acceptance network computing device **16**, one or more cryptocurrency exchange device(s) **18**, a database **20**, and a consensus network **36** that includes a plurality of consensus devices **1**-*n*. The secure & trusted cryptocurrency acceptance system **10** enables secure and trusted financial transactions between a payor computing device **12** paying with a cryptocurrency and a payee computing device **14** accepting a desired currency (e.g., fiat currency) to overcome one or more of the following issues.

[0029] At the filing of this application, cryptocurrency is not widely accepted by merchants as a form of payment for a variety of reasons. For example, the value of cryptocurrency can be volatile, sometimes fluctuating dramatically in the course of one day. As another example, merchants are reluctant to invest in expensive point-of-sale upgrades to accommodate cryptocurrency payments directly. As yet another example, most customers and merchants do not wish to have their transactions made public, which would occur since many cryptocurrency payments are public.

[0030] While some developed digital wallets applications have been developed to enable retail blockchain payments, they are universally dependent on existing payment networks and thus are susceptible to fraud attacks of the existing payment networks. For example, a cryptocurrency is linked to a credit card, where a cryptocurrency payment is converted and conducted as a credit card transaction and, thus susceptible to the same fraud attacks as credit cards.

[0031] Even though cryptocurrencies significantly reduce fraudulent activity as compared to traditional payment systems, fraudulent cryptocurrency transactions are still possible. For example, malicious users can manipulate a cryptocurrency blockchain to "double spend" (e.g., create one block to transfer an amount to a merchant and another block to transfer the amount back to him or herself). As another example, malicious or faulty digital wallet software can prevent a cryptocurrency transaction from being authorized and completed correctly.

[0032] Within the secure & trusted cryptocurrency acceptance system **10** the payor computing device **12**, the payee computing device **14**, the cryptocurrency acceptance network computing device **16**, the one or more cryptocurrency exchange device(s) **18**, and the consensus devices **1**-*n* may be portable computing devices and/or a fixed computing devices. A portable computing device may be a social networking device, a gaming device, a cell phone, a smart phone, a digital assistant, a digital music player, a digital video player, a laptop computer, a handheld computer, a tablet, a video game controller, a portable merchant point-of-sale (POS) device (e.g., a mobile device with POS capabilities) and/or any other portable device that includes a computing core **26**. A fixed computing device may be a computer (PC), a computer server, a cable set-top box, a satellite receiver, a television set, a printer, a fax machine, home entertainment equipment, a video game console, a fixed merchant point-of-sale (POS) device (e.g., cash register), and/or any type of home or office computing equipment.

[0033] The network **22** includes one or more local area networks (LAN) and/or one or more wide area networks

(WAN), which may be a public network and/or a private network. A LAN may be a wireless-LAN (e.g., Wi-Fi access point, Bluetooth, ZigBee, etc.) and/or a wired LAN (e.g., Firewire, Ethernet, etc.). A WAN may be a wired and/or wireless WAN. For example, a LAN is a personal home or business's wireless network and a WAN is the Internet, cellular telephone infrastructure, and/or satellite communication infrastructure.

[0034] Each of the payor computing device **12**, the payee computing device **14**, the cryptocurrency acceptance network computing device **16**, the one or more cryptocurrency exchange device(s) **18**, and the consensus devices **1**-*n* includes a network unit **24**, a computing core **26**, an input/output (TO) unit **28**, and a memory **30**. Each network unit **24** includes software and hardware to support one or more communication links via the network **22** directly and/or indirectly. For example, the network unit **24** of the payor computing device **12** supports a network **22** communication link between the payor computing device **12** and the devices **14**-**16**. The computing cores **26** include one or more of: one or more processing modules, one or more main memories (e.g., RAM), a core control module, a video graphics processing module, an IO control module, and a peripheral interface control module.

[0035] The IO units **28** enable connections between devices **12**-**18** and user inputs/peripheral devices. Unit inputs/peripheral devices include one or more of an external hard drive, headset, a keypad, a keyboard, control switches, a touchpad, a speaker, a microphone, a thumb drive, a camera, etc.

[0036] The memories **30** include one or more of main memory (RAM), hard drives, solid-state memory chips, one or more other large capacity storage devices, and/or cache memory. The memories **30** store operational instructions for the computing cores **26**. For example, the payor computing device **12** memory **30** stores data application "b" **40**, the cryptocurrency acceptance network computing device **16** memory **30** stores data application "a" **38**, and the payee computing device **16** memory **30** stores data application "c" **42**. The payor computing device **12** memory **30** further stores a network cryptocurrency wallet **46**. The various applications stored by the devices support secure and trusted cryptocurrency transactions within the system as described herein.

[0037] The database **20** is a special type of computing device that is optimized for large scale data storage and retrieval. The database **20** includes similar components to that of the devices **12**-**18** with more hard drive memory (e.g., solid state, hard drives, etc.) and potentially with more processing modules and/or main memory. Further, the database **20** is typically accessed remotely; as such it does not generally include user input devices and/or user output devices. An embodiment of a database **20** may include a standalone separate computing device and/or may be a cloud computing device.

[0038] The database **20** includes cryptocurrency wallets for users **1**-*n* **48**-**50**. The cryptocurrency acceptance network computing device **16** and the database **20** are secure devices implementing high level security protocols to prevent unauthorized use, hacking, etc. For example, the database **20** is a cryptocurrency holding company separate from the cryptocurrency acceptance network computing device **16** that has been specially licensed to store sensitive materials and has insurance policies to protect against theft and fraud.

[0039] The cryptocurrency exchange device(s) **18** are specially licensed entities operable to convert cryptocurrency to a desired currency (e.g., fiat currency, another cryptocurrency, etc.). In an embodiment, the cryptocurrency exchange device(s) **18** are associated with one or more cryptocurrency holding companies that are specially licensed to store sensitive materials and have insurance policies to protect against theft and fraud. In another embodiment, cryptocurrency exchange device(s) **18** are standalone secure devices.

[0040] The cryptocurrency exchange device(s) **18** may be associated with a stored value account (SVA) device where the SVA device is associated with the payee computing device **14** (e.g., the payee computing device has an SVA account with the SVA device) such that the one or more of the cryptocurrency exchange device(s) **18** are operable to generate SVAs for transactions. In another embodiment, one or more of the cryptocurrency exchange device(s) **18** and the cryptocurrency acceptance network computing device **16** are operable to generate stored value accounts (SVAs) and/or are associated with one or more entities operable to generate SVAs. Generation of SVAs for transactions is described in co-pending patent application Ser. No. 16/376,911, entitled, "SECURE AND TRUSTED DATA COMMUNICATION SYSTEM," filed Apr. 5, 2019.

[0041] The cryptocurrency acceptance network computing device **16** further includes a database interface **34** that enables a connection between the cryptocurrency acceptance network computing device **16** and the database **20**. The payor computing device **12** and the payee computing device **14** include a direct communication unit **32** that allows for a direct communication between them. For example, the direct communication unit **32** includes technology to establish a direct link between the payor computing device **12** and the payee computing device **14** via video, infrared (IR), near-field communication (NFC), etc.

[0042] The payee computing device **14** may be one or more computing devices having an affiliation with a specific merchant identifier (ID). For example, the payee computing device **14** is a point of sale (POS) device in a retail store associated with a particular merchant having the specific merchant ID. The payee computing device **14** is associated with the cryptocurrency acceptance network computing device **16**. For example, the payee computing device has an account with the cryptocurrency acceptance network computing device **16**. The account setup establishes data application "c" **42** in the payee computing device **14**'s memory **30** and includes instructions for securely receiving payments via the secure & trusted cryptocurrency acceptance system **10**.

[0043] The payor computing device **12** is associated with a user and is associated with the cryptocurrency acceptance network computing device **16**. For example, the payor computing device **12** (e.g., a user's smart phone) downloads and stores the network cryptocurrency wallet **46** which includes data application "b" **40**, and the network cryptocurrency wallet **46** is associated with the cryptocurrency acceptance network computing device **16**. For example, the network cryptocurrency wallet **46** may be a secure custodial digital wallet managed by the cryptocurrency acceptance network computing device **16** (e.g., via database **20**). In this example, the payor computing device **12** (e.g., user **1**) sets up a user account with the cryptocurrency acceptance network computing device **16** for the secure and trusted storage of cryptocurrency via the network cryptocurrency wallet **46**.

The payor computing device **12** initiates user account set-up and downloads data application "b" **40** which includes instructions for cryptocurrency management, storage, and transactions.

[0044] The cryptocurrency acceptance network computing device **16** memory **30** stores data application "a" **38**, which has instructions for cryptocurrency management, conveyance, and storage via the database **20** (e.g., user cryptocurrency wallet creation and management, etc.). For example, upon the payor computing device **12**'s user account set up, the cryptocurrency acceptance network computing device **16** generates one or more cryptocurrency wallets associated with the payor computing device **12** in the database **20**. For example, the cryptocurrency acceptance network computing device **16** generates the cryptocurrency wallet user **1 48** in the database **20** for secure storage of the payor computing device **12**'s cryptocurrency.

[0045] The cryptocurrency acceptance network computing device **16** functions to store cryptocurrency on behalf of a payor computing device as described in co-pending patent application Ser. No. 16/376,911, entitled, "SECURE AND TRUSTED DATA COMMUNICATION SYSTEM," filed Apr. 5, 2019 (see secure data conveyance device **14** and user computing device **12**).

[0046] As another example, the cryptocurrency acceptance network computing device **16** does not store cryptocurrency on behalf of the payor computing device **12**. For example, the network cryptocurrency wallet **46** is managed by a digital wallet developer that is associated with the cryptocurrency acceptance network computing device **16**. For example, the digital wallet developer has an account with the cryptocurrency acceptance network computing device **16**. The digital wallet developer may be a custodial wallet that stores cryptocurrency on behalf of the payor computing device **12** or it may be a private wallet where only payor computing device **12** has access to network cryptocurrency wallet user's private key information. In either example, when the payor computing device **12** sets up a user account with the network cryptocurrency wallet **46**, data application "b" **40** is installed which includes instructions on processing financial transactions using the network cryptocurrency wallet **46**.

[0047] Each of the plurality of consensus devices **1**-*n* of the consensus network **20** includes a network unit (e.g., like network unit **24**), computing core (e.g., like computing core **26**), IO unit (e.g., like IO unit **28**), and is connected via the network **22**. The consensus devices **1**-*n* validate cryptocurrency transactions. For example, a consensus device uses "proof of work" secure hashing algorithms to validate a cryptocurrency transaction block (e.g., a "miner") and adds the block to the blockchain. When a transaction is validated enough times (i.e., enough blocks verifying the transaction are added to the blockchain), it is adopted by the consensus network **36** as valid (i.e., a consensus among the consensus devices **1**-*n* is reached). As another example, the consensus devices **1**-*n* use asynchronous consensus algorithms to communicate with each other and reach consensus in a decentralized manner. This method involves using directed acyclic graphs for time-sequencing transactions without bundling them into blocks. Other methods of decentralized consensus may be used.

[0048] The cryptocurrency acceptance network computing device **16** further includes a stake pool unit **44**. The stake pool unit **44** includes one or more memory devices, or is part of another memory device (e.g., memory **30**), and includes a processing module, or is part of a processing module of the computing core **26**). The stake pool unit **44** stores information regarding stake accounts **1**-*n*, includes a stake account manager **52**, and stores information regarding a transaction fee/rewards pool **80**. The stake accounts **1**-*n* store collateral cryptocurrency to secure transactions within the secure & trusted cryptocurrency acceptance system **10**. Collateral cryptocurrency is purchased from a set amount of system specific cryptocurrency created for use within the secure & trusted cryptocurrency acceptance system **10**. In order to be recognized by the secure & trusted cryptocurrency acceptance system **10**, a cryptocurrency wallet must be associated with a stake pool account that is backed with collateral cryptocurrency.

[0049] For example, a digital wallet developer creates an account with the cryptocurrency acceptance network computing device **16** in order for its wallet users to be a part of the secure & trusted cryptocurrency acceptance system **10**. As part of the account set up, the digital wallet developer purchases and pledges a certain amount of collateral cryptocurrency into a stake account for purposes of backing the financial transactions of its wallet users. When the network cryptocurrency wallet **46** is managed by the cryptocurrency acceptance network computing device **16**, the cryptocurrency acceptance network computing device **16** must also purchase and pledge collateral cryptocurrency into a stake account for its wallet users. An entity that pledges collateral cryptocurrency is referred to as a staking entity.

[0050] The stake account manager **52** manages the plurality of stake accounts **1**-*n*. In an embodiment, the stake accounts **1**-*n* are "on-chain" smart contracts such as an Ethereum blockchain smart contract (i.e., they are visible to everyone) but the stake account manager **52** stores information and conducts activities "off-chain" (i.e., privately). For example, the stake manager manages withdrawals of rewards from stake accounts, maintains an event log of stake pool activities, stores staking entity information (e.g., rewards percentage per successful transaction, terms of rewards withdrawals, etc.), and calculates the rewards owed to the staking entities at a given time.

[0051] In exchange for pledging collateral cryptocurrency, staking entities are provided rewards such as a percentage back on successful transactions completed by their wallet's users. Because of the incentives provided, a variety of staking entities (e.g., individual user computing devices, other wallet developers) may wish to pledge collateral cryptocurrency into one or more stake accounts. Therefore, a staking entity of the stake pool unit **44** includes one or more digital wallet developer/managers and potentially one or more other computing devices.

[0052] Because there is a finite amount of system cryptocurrency, the value of the system cryptocurrency will continue to grow and serve as further incentive for a variety of staking entities to obtain and pledge collateral cryptocurrency into stake accounts. Also, because incentives are provided based on successful transactions, digital wallet developers/managers are motivated to produce and maintain a secure digital wallet (e.g., no faulty software) and prevent and deter fraudulent activity by its users on the network. The stake pool unit **44** will be discussed in greater detail with reference to FIGS. **6-12**.

[0053] In an example of operation, the payor computing device **12** establishes a direct communication link with the

payee computing device **14** via the direct communication link **32** (e.g., NFC, IR, RF). The payor computing device **12** sends the payee computing device **14** a request to initiate purchase of a product or service using cryptocurrency stored in the network cryptocurrency wallet **46**. The payee computing device **14** accepts a desired currency (e.g., fiat currency, a form of cryptocurrency, etc.).

[0054] The request to initiate purchase may be in the form of a split bar code, where the payor computing device **12** maintains one portion of a bar code and the payee computing device **14** maintains another portion of a bar code such that when they are aligned in close proximity, the conveyance is initiated. Having a correct piece of a barcode from the payor computing device **12** as well as the act of alignment, demonstrates intent to enter into a financial transaction (i.e., user authorization). As another example, the request is a secure handshake protocol between the payor computing device **12** and the payee computing device **14**.

[0055] When the request to initiate the financial transaction is approved by the payee computing device **14** (e.g., via the split bar code example), the payor computing device **12** receives an acknowledgement of the financial transaction (e.g., a one-time use code such as a transaction ID) from the payee computing device **14**. The one-time use code is one or more of: a unique number, an alpha numeric, a function, and/or any item that uniquely connects the parties in the transaction to the particular transaction. For example, the payee computing device **14** approves the request when the payee computing device **14** is affiliated with the cryptocurrency acceptance network computing device **16**, the payor computing device **12** is a trusted computing device (e.g., by verification of ID, certificate, etc.), etc.

[0056] When a financial transaction is initiated by the payor computing device **12** using the network cryptocurrency wallet **46**, the cryptocurrency acceptance network computing device **16** receives an acknowledgment of the initiation of the financial transaction and a request to process the financial transaction. For example, the payor computing device **12** sends the request to process the financial transaction plus the one-time use code to the cryptocurrency acceptance network computing device **16**. The cryptocurrency acceptance network computing device **16** places a hold on an amount of collateral cryptocurrency in a stake account of the stake pool unit **44** associated with the network cryptocurrency wallet **46**.

[0057] The amount of collateral cryptocurrency placed on hold may be determined based on one or more properties of the network cryptocurrency wallet **46** and/or the stake account associated with the network cryptocurrency wallet **46**. For example, the amount of collateral cryptocurrency placed on hold is a default hold amount based on one or more of the payee computing device and the network cryptocurrency wallet. As a specific example, transactions involving a particular merchant require a default amount of collateral cryptocurrency placed on hold. As another specific example, transactions using a particular network cryptocurrency wallet may require a default amount of collateral cryptocurrency placed on hold regardless of the merchant or user involved.

[0058] As another example, the amount of collateral cryptocurrency placed on hold is based on the characteristics of one or more of the payor computing device **12**, the payee computing device **14**, and the stake account involved. As a specific example, the amount of collateral cryptocurrency placed on hold may be based on the amount of cryptocurrency the payor computing device **12** typically spends on an individual transaction. As another specific example, when the payee computing device **14** is associated with a high end merchant, a greater amount of collateral cryptocurrency is placed on hold. As yet another specific example, the amount of collateral cryptocurrency placed on hold may be based on the balance of the stake account. A higher balance may indicate that higher amounts of collateral cryptocurrency may be placed on hold for individual transaction.

[0059] As another example, the amount of collateral cryptocurrency placed on hold is based on the total amount of cryptocurrency currently stored in the network cryptocurrency wallet **46** by the payor computing device. As a specific example, the payor computing device **12** may spend any amount up to the full balance of what is stored on the network cryptocurrency wallet **46**. Thus, the balance amount worth of collateral cryptocurrency is placed on hold to cover a transaction until more information is known.

[0060] When the amount of collateral cryptocurrency is placed on hold, the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** an acknowledgment that the requisite amount of collateral cryptocurrency is on hold and the financial transaction can proceed. The payor computing device **12** sends an amount of cryptocurrency equal to the amount of desired currency requested by the payee computing device **14** to the cryptocurrency acceptance network computing device **16**. Sending the amount of cryptocurrency equal to the amount of desired currency requested by the payee computing device to the cryptocurrency acceptance network computing device **16** is a transaction added to the cryptocurrency blockchain of the cryptocurrency used by the payor computing device **12**.

[0061] The transaction information includes the payment amount, the sender cryptocurrency address (the payor computing device **12**), and the recipient cryptocurrency address (the cryptocurrency acceptance network computing device **16**). The transaction is then included within a block that is published on the blockchain. However, other details related to the transaction (e.g., the identity of the payee computing device, transaction fees owed by the payee computing device, etc.) are managed privately by the cryptocurrency acceptance network computing device **16** off-chain. Therefore, by using the secure & trusted cryptocurrency acceptance system **10**, confidential payee related information (e.g., revenue, consumer spending behavior, etc.) and confidential payor related information (e.g., consumer identity of purchases, amount spent at a particular merchant, payees/merchants frequented, etc.) is private (i.e., not published on the blockchain for anyone to see).

[0062] Alternatively, or additionally, the payee computing device **14** sends a notice of the financial transaction which includes the amount of desired currency requested (e.g., an amount of US dollars) to the cryptocurrency acceptance network computing device **16**. The cryptocurrency acceptance network computing device **16** sends the payor computing device **12** a network transaction acknowledgement that the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold.

[0063] Alternatively, when the amount of desired currency requested is more than the amount of collateral cryptocurrency on hold, the cryptocurrency acceptance network computing device **16** may place further collateral cryptocurrency

on hold to equal the amount of desired currency requested if allowed (e.g., by the terms of the stake account associated with the network cryptocurrency wallet **46**). If not allowed, the cryptocurrency acceptance network computing device **16** cancels the transaction before the transaction is finalized between the payor computing device **12** and the payee computing device **14**.

[0064] The payor computing device **12** sends the payee computing device **14** a notification to finalize the transaction. The notification to finalize the transaction includes the network transaction acknowledgement information from the cryptocurrency acceptance network computing device **16** (e.g., the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold) such that the payee computing device **14** can close the financial transaction knowing that the desired funds will arrive.

[0065] The cryptocurrency acceptance network computing device **16** seeks a desired number of confirmations of payor computing device **12**'s cryptocurrency payment from the consensus network **20**. The desired number of confirmations corresponds to the type of cryptocurrency used. Receipt of the desired number of confirmations may take minutes to hours of time.

[0066] For example, in the Bitcoin blockchain, miners record new transactions into blocks that verify all previous transactions within the blockchain. On average, it takes a miner ten minutes to write a block on the Bitcoin blockchain and the average block time depends on a total hash power of the Bitcoin network. Once a block is created and a new transaction is verified and included in a block, the transaction will have one confirmation. Each subsequent block (which verifies the previous state of the blockchain) provides one additional network confirmation. Typically, between 5-10 transaction confirmations are acceptable for cryptocurrency exchanges to avoid losses due to potential fraud. Therefore, if the payor computing device **12** is using Bitcoin, the transaction may not be confirmed by the consensus network **36** (i.e., Bitcoin miners) for an hour or more.

[0067] However, because every financial transaction is backed with collateral cryptocurrency, the cryptocurrency acceptance network computing device **16** proceeds with the financial transaction and is guaranteed that the desired amount of confirmations will be received.

[0068] The cryptocurrency acceptance network computing device **16** adjusts the amount of collateral cryptocurrency on hold to equal the amount of desired currency requested when the amount of desired currency requested is less than the amount of collateral cryptocurrency on hold. For example, if the equivalent of $20 worth of collateral cryptocurrency is placed on hold but the transaction specifies a payment amount of $10, the cryptocurrency acceptance network computing device **16** releases the hold on $10 worth of the $20 worth of collateral cryptocurrency that is not required to back the transaction.

[0069] The cryptocurrency acceptance network computing device **16** sends the amount of cryptocurrency sent by the payor computing device **12** to the cryptocurrency exchange device(s) **18**. The cryptocurrency exchange device (s) **18** convert the amount of cryptocurrency sent by the payor computing device **12** to an amount equal to the amount of desired currency requested by the payee computing device **14**. Cryptocurrency exchange is done quickly (e.g., 30 seconds to a few minutes) to account for exchange rate volatility. The exchange can also be performed in real time on a credit-based account to eliminate any pricing volatility. The cryptocurrency exchange device(s) **18** deposit the amount equal to the amount of desired currency requested by the payee computing device **14** into a payee banking computing device associated with the payee computing device **14**.

[0070] Alternatively, the cryptocurrency exchange device (s) **18** deposit the amount equal to the amount of desired currency requested by the payee computing device **14** into a cryptocurrency acceptance system banking device of the secure & trusted cryptocurrency acceptance system and the cryptocurrency acceptance system banking device deposits the amount equal to the amount of desired currency into the payee banking computing device. The payee banking computing device sends a receipt of the deposit of the amount of desired currency plus a transaction fee to the cryptocurrency acceptance network computing device **16**.

[0071] Transaction fees are accumulated and used to purchase system specific cryptocurrency for distribution to one or more of stake accounts **1**-*n* as rewards. The transaction fees are stored in the transaction fee/rewards pool **80** of the stake pool unit **44** until a distribution of rewards occurs (e.g., upon request by a staking entity, at a predetermined time, or after a certain amount of transactions occur etc.). The stake account manager **52** calculates rewards owed using a zero knowledge proof smart contract to batch and distribute rewards to one or more stake accounts. A more detailed discussion of the stake account manager **52** and rewards calculation will be discussed with reference to FIGS. **8**-**9**.

[0072] In another embodiment, the cryptocurrency acceptance network computing device **16** is further operable to instruct the cryptocurrency exchange device(s) **18** to convert the amount of cryptocurrency sent by the payor computing device **12** to an SVA in the amount equal to or more than the amount of desired currency requested by the payee computing device **14**. Use of an SVA is another method of securing financial transactions of the secure & trusted cryptocurrency acceptance system **10**. An SVA is valid for a particular financial transaction, expires in a short period of time (e.g., a few seconds, 30 seconds, one minute, or more) if not properly received by the payee computing device **14**, and is only usable by the payee computing device **14**. If a remaining balance exists after the transaction, the SVA is adjusted automatically to the actual spent amount. Creation and use of an SVA happens very quickly in order to minimize the volatility aspects of cryptocurrency conversion.

[0073] When the desired number of confirmations are received for the transaction between computing device **12** payee computing device **14** by the cryptocurrency acceptance network computing device **16** from the consensus network **36**, the cryptocurrency acceptance network computing device **16** releases the hold on the amount of collateral cryptocurrency.

[0074] If fraudulent activity occurs (e.g., the payor computing device acts maliciously to spend at two payee computing devices simultaneously, the software of the network cryptocurrency wallet **46** is corrupted, etc.) the cryptocurrency acceptance network computing device **16** withdraws the collateral cryptocurrency on hold from the stake account. For example, if the payor computing device **12** attempts to double spend a transaction, the desired number of confirmations will not be received. If the desired number of confirmations are not received, the cryptocurrency accep-

tance network computing device **16** withdraws the amount of collateral cryptocurrency on hold to cover the transaction that occurred with the payee computing device **14**.

[0075] As another example, if the payor computing device **12** sends the cryptocurrency to the cryptocurrency acceptance network computing device **16** through an error in the software of the network cryptocurrency wallet **46** (e.g., the network cryptocurrency wallet **46** experiences an error and allows a user to spend money it does not have) the desired number of confirmations will also not be received. If the desired number of confirmations are not received, the cryptocurrency acceptance network computing device **16** withdraws the amount of collateral cryptocurrency on hold to cover the transaction that occurred with the payee computing device **14**.

[0076] As another example, the network cryptocurrency wallet **46** may send a financial transaction failure notification to the cryptocurrency acceptance network computing device **16** when the transaction occurs through an error in the software of the network cryptocurrency wallet **46**. If the error is recognized by the payor computing device **12**'s network cryptocurrency wallet **46** after finalization of the transaction with the payee computing device **14** but prior to the cryptocurrency acceptance network computing device **16** receiving the desired amount of confirmations, the network cryptocurrency wallet **46** sends the financial transaction failure notification to the cryptocurrency acceptance network computing device **16**. The amount of cryptocurrency spent is requested back, and the cryptocurrency acceptance network computing device **16** withdraws the amount of collateral cryptocurrency on hold to cover the transaction that occurred with the payee computing device **14**.

[0077] FIGS. **2**A-**2**C are flowcharts of an example of a method of a financial transaction of the secure & trusted cryptocurrency acceptance system **10** of FIG. **1**. The method begins on FIG. **2**A with step (**1***a*) where the payor computing device **12** establishes a direct communication link with the payee computing device **14** to initiate a financial transaction. The payor computing device **12**'s network cryptocurrency wallet **46** is storing 100 units of a cryptocurrency (CC) "aaa" (i.e., a first cryptocurrency). Cryptocurrency "aaa" may be any type of cryptocurrency approved for exchange by the one or more cryptocurrency exchange device(s) **18**. In this example, the payor computing device **12** wishes to pay the payee computing device **14** using cryptocurrency "aaa," but the payee computing device **14** accepts US dollars.

[0078] The request to initiate purchase at step (**1***a*) may be in the form of a split bar code, where the payor computing device **12** maintains one portion of a bar code and the payee computing device **14** maintains another portion of a bar code such that when they are aligned in close proximity, the conveyance is initiated. Having a correct piece of a barcode from the payor computing device **12** as well as the act of alignment, demonstrates intent to enter into a financial transaction (i.e., user authorization). As another example, the request is a secure handshake protocol between the payor computing device **12** and the payee computing device **14**.

[0079] The method continues at step (**1***b*) where the payor computing device **12** receives an acknowledgement of the financial transaction (e.g., a one-time use code such as a transaction ID) from the payee computing device **14**. The one-time use code is one or more of: a unique number, an alpha numeric, a function, and/or any item that uniquely connects the parties in the transaction to the particular transaction. For example, the payee computing device **14** approves the request when the payee computing device **14** is associated with the cryptocurrency acceptance network computing device **16** and the terms of the transaction are valid.

[0080] The method continues at step (**2***a*) where, when a financial transaction is initiated by the payor computing device **12** using the network cryptocurrency wallet **46**, the cryptocurrency acceptance network computing device **16** receives an acknowledgment of the initiation of the financial transaction and a request to process the financial transaction. For example, the payor computing device **12** sends the request to process the financial transaction plus the one-time use code to the cryptocurrency acceptance network computing device **16**.

[0081] The cryptocurrency acceptance network computing device **16** includes the stake pool unit **44**. The stake pool unit **44** includes a plurality of stake accounts **1**-*n*. Staking entities (e.g., wallet developers, individuals, etc.) pledge an amount of system specific cryptocurrency (Flexacoin (FXC)) to a stake account for purposes of backing financial transactions of a cryptocurrency wallet's users (i.e., collateral cryptocurrency). Flexacoin is a token on the Ethereum blockchain developed specifically for use within the secure & trusted cryptocurrency acceptance system **10** as a collateral utility token. A more detailed discussion of the stake pool unit **44** and the plurality of stake accounts **1**-*n* is disclosed with reference to FIGS. **6**-**12**.

[0082] In order for a cryptocurrency wallet to be recognized by the secure & trusted cryptocurrency acceptance system **10**, the cryptocurrency wallet is associated with a stake account of the stake pool unit **44**. In this example, the network cryptocurrency wallet **46** is associated with stake account **1**. For example, the digital wallet developer of the network cryptocurrency wallet **46** and possibly one or more other staking entities have deposited 1000 units of Flexacoin in stake account **1** to back financial transactions of users of the network cryptocurrency wallet **46**.

[0083] At step (**2***b*), the cryptocurrency acceptance network computing device **16** places a hold on an amount of Flexacoin in stake account **1**. In this example, 100 units of cryptocurrency "aaa" worth of Flexacoin (e.g., an amount of Flexacoin equal to the total amount of cryptocurrency stored in the network cryptocurrency wallet **46**) of the 1000 units of amount of Flexacoin in the stake account **1** is placed on hold to back the financial transaction. The 100 units of cryptocurrency "aaa" worth of Flexacoin is referred to as "X" amount of Flexacoin for simplicity.

[0084] For example, if cryptocurrency "aaa" and Flexacoin have a one-to-one conversion, "X" equals 100 units and there are now 900 units of Flexacoin available in stake account **1** to back financial transactions of other users of the network cryptocurrency wallet **46**. The information pertaining to the hold on "X" amount of Flexacoin of stake account **1** is added to the stake pool smart contract. Transactions within the smart contract include the data required to publish the state of the stake pool transactions to the blockchain. The contract may also include various other information.

[0085] The method continues with step (**2***c*), where, when the "X" amount of Flexacoin is placed on hold, the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** a first network acknowledgment (ACK) that the requisite amount of collateral cryptocurrency is on hold and the financial transaction can proceed. If the

requisite amount of collateral cryptocurrency cannot be placed on hold (e.g., the stake account does not have enough collateral cryptocurrency available) the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** an error notification and cancels the financial transaction at step (**2***c*).

[0086] The method continues with step (**3***a*) where the payor computing device **12** sends the amount of cryptocurrency "aaa" equal to the amount of US dollars requested by the payee computing device **14** to the cryptocurrency acceptance network computing device **16**. In this example, the payee computing device **14** is requesting $10. A transaction including information pertaining to transfer of "$10" worth of "aaa" cryptocurrency is added to a block within the "aaa" blockchain. The block includes a header section and a transaction section. The header section includes a block number (e.g., block #**1**) plus a hash of the previous block (not shown). The header section and/or the transaction section may include various other information.

[0087] The transaction information includes the payment amount, the sender cryptocurrency address (the payor computing device **12**), and the recipient cryptocurrency address (the cryptocurrency acceptance network computing device **16**, not the payee computing device **14**). The transaction is then included within a block that is published on the blockchain. However, other details related to the transaction (e.g., the identity of the payee computing device, transaction fees owed by the payee computing device, etc.) are managed privately by the cryptocurrency acceptance network computing device **16** off-chain. Thus, by using the secure & trusted cryptocurrency acceptance system **10**, confidential payee related information (e.g., revenue, items being sold, consumer spending behavior, etc.) and confidential payor related information (e.g., consumer identity, items purchased, amount spent at a particular merchant, merchants frequented, etc.) is private (i.e., not published on the blockchain for anyone to see).

[0088] Alternatively, or additionally, the payee computing device **14** sends a notice of the financial transaction which includes the amount of desired currency requested (e.g., an amount of US dollars) to the cryptocurrency acceptance network computing device **16** at step (**3***a*+). The method continues with step **3**(*b*) where the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** a network transaction acknowledgement (i.e., a second network acknowledgement (ACK)) that the amount of cryptocurrency received is covered by the amount of collateral cryptocurrency placed on hold. The network transaction acknowledgment of step **3**(*b*) may further include a stored value account (SVA) in an amount equal to or greater than the amount of the transaction generated for the payor computing device **12** to use to complete the transaction with the payee computing device **14**.

[0089] Alternatively, if the amount of cryptocurrency received is not covered by the amount of collateral cryptocurrency placed on hold, the cryptocurrency acceptance network computing device **16** may cancel the transaction at **3**(*b*) or place a further amount of Flexacoin on hold to cover the transaction at **3**(*b*) depending on the terms of stake account **1**.

[0090] In this example, the balance of the network cryptocurrency wallet **46** worth of Flexacoin is placed on hold so the payor computing device **12** would not be able to spend more than the amount placed on hold. However, in other examples where the amount of collateral cryptocurrency placed on hold is based on other factors (e.g., merchant ID, typical transaction amounts, etc.), the payor computing device **12** may initiate a transaction for more than what is placed on hold. The terms of the stake account **1** indicate how to proceed in such cases. For example, the stake account **1** may indicate that a user of the network cryptocurrency wallet **46** has a particular spending cap on any individual purchase. Any request that requires a hold on over the spending cap is rejected. However, for a request equal to or lower than the spending cap, additional collateral cryptocurrency is placed on hold so that the transaction can proceed.

[0091] The method continues with step **3**(*c*) where the payor computing device **12** sends the payee computing device **14** a notification to finalize the transaction. The notification to finalize the transaction includes the network transaction acknowledgement information from the cryptocurrency acceptance network computing device **16** (e.g., the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold) such that the payee computing device **14** can close the financial transaction knowing that the desired funds will arrive or be available by liquidating collateral from the stake pool contract. The notification to finalize the transaction of step **3**(*c*) may further include the SVA in an amount equal to or greater than the amount of the transaction generated for the payor computing device **12** to use to complete the transaction with the payee computing device **14**.

[0092] As a simplified example summary of FIG. **2**A, the payor computing device **12** desires to do a transaction with payee computing device **14** using cryptocurrency "aaa". The payor computing device **12** sends a request to the payee computing device **14** regarding the desired transaction. When the transaction is agreeable to the payee computing device **14**, the payee computing device **14** sends an ACK of the transaction.

[0093] When the payor and payee computing devices agree to the desired transaction, the payor computing device **12** sends the cryptocurrency acceptance network computing device **16** a request to execute the transaction using the cryptocurrency "aaa". If payor computing device **12** has cryptocurrency "aaa" in its wallet and the cryptocurrency "aaa" is properly staked (e.g., enough to cover the amount in the payor's wallet), then the cryptocurrency acceptance network computing device **16** places a hold on the stake account. With a hold on the stake account, the cryptocurrency acceptance network computing device **16** sends a network ACK to the payor computing device that the payor computing device is authorized to use its cryptocurrency "aaa" with the payee computing device.

[0094] Upon receiving the network ACK, the payor computing device **12** notifies the cryptocurrency acceptance network computing device **16** of the amount of the transaction. If the amount of the transaction is less than the amount of cryptocurrency "aaa" that is on hold, the cryptocurrency acceptance network computing device **16** sends an ACK for the specific transaction. The payor and payee computing devices execute the transaction. This process typically takes less than a few seconds to perform.

[0095] The method continues on FIG. **2**B with step (**4***a*-**1**) where the cryptocurrency acceptance network computing device **16** seeks a desired number of confirmations of block #**1** (e.g., the use of $10 worth of cryptocurrency "aaa" for the

transaction) on the "aaa" blockchain **54** via the consensus network **36**. The consensus network **36** includes a plurality of consensus devices **1**-*n*. For example, in the Bitcoin blockchain, miners record new transactions into blocks that verify all previous transactions within the blockchain. On average, it takes a miner ten minutes to write a block on the Bitcoin blockchain and the average block time depends on a total hash power of the Bitcoin network.

[0096] The desired number of confirmations corresponds to the type of cryptocurrency used. As shown here, the cryptocurrency acceptance network computing device **16** requires "n" confirmations before the transaction on the "aaa" blockchain **54** is considered "final". Receipt of the desired number of confirmations may take minutes to hours of time. However, because every financial transaction is backed with Flexacoin as collateral, the cryptocurrency acceptance network computing device **16** proceeds with the financial transaction and is guaranteed that funds will ultimately be available.

[0097] The method continues at step (**4***a*-**2**) where the cryptocurrency network computing device **16** adjusts the X amount of Flexacoin on hold to equal $10 worth of Flexacoin. $10 worth of Flexacoin is referred to as "y" amount of Flexacoin for simplicity. For example, when the conversion rate between Flexacoin and US dollars is one-to-one, and X is equal to 100, the cryptocurrency acceptance network computing device **16** releases the hold on 90 units of Flexacoin (i.e., "X-y") such that only 10 units of Flexacoin are on hold. The information pertaining to the hold on "X-y" amount of Flexacoin of stake account **1** is added to the stake pool smart contract. Transactions within the smart contract include the data required to publish the state of the stake pool transactions to the blockchain. The contract may also include various other information.

[0098] The method continues with step (**4***a*-**3**) where the desired number of confirmations are received by the cryptocurrency acceptance network computing device **16** from the consensus network **36**. The method continues with step (**4***a*-**4**) where the cryptocurrency acceptance network computing device **16** releases the hold on the "y" amount of Flexacoin of stake account **1**. A block including information pertaining to releasing the hold on "y" amount of Flexacoin of stake account **1** is added to the Flexacoin blockchain. For simplicity, the block includes a header section that includes a block number (e.g., block #**3**) and a transaction section.

[0099] Concurrently with seeking desired confirmations in step (**4***a*-**2**) on FIG. **2**B, the method continues with step (**4***b*-**1**) on FIG. **2**C where the cryptocurrency acceptance network computing device **16** sends the $10 worth of cryptocurrency "aaa" sent by the payor computing device **12** to the cryptocurrency exchange device(s) **18**. The method continues with step (**4***b*-**2**) where the cryptocurrency exchange device(s) **18** convert the $10 worth of cryptocurrency "aaa" sent by the payor computing device **12** to $10 of a desired currency (e.g., US dollars). Cryptocurrency exchange is done quickly (e.g., 30 seconds to a few minutes) to account for exchange rate volatility.

[0100] The method continues with step (**4***b*-**3**) where the cryptocurrency exchange device(s) **18** deposit the $10 into a payee banking computing device **56** associated with the payee computing device **14**. Alternatively, the cryptocurrency exchange device(s) **18** deposit the $10 into a Flexa banking computing device **55** (e.g., a secure & trusted cryptocurrency acceptance system **10** banking computing device) at step (**4***b*-**3+**) and the Flexa banking computing device **55** deposits the $10 into a payee banking computing device **56** at step (**4***b*-**3**). The method continues with step (**4***b*-**4**) where the payee banking computing device **56** sends a receipt of the deposit of the $10 plus a transaction fee to the cryptocurrency acceptance network computing device **16**. The transaction fee is stored in the transaction fee/rewards pool **80** of the stake pool unit **44** for rewards calculation and distribution.

[0101] FIG. **3** is a schematic block diagram of an example of an attempted fraudulent transaction within the secure & trusted cryptocurrency acceptance system **10**. In this example, the payor computing device **12** is a bad actor attempting to "double spend" on the "aaa" cryptocurrency blockchain **54**. Referring to step (**3***a*) of FIG. **2**A, where the payor computing device **12** transfers the $10 worth of cryptocurrency "aaa" to the cryptocurrency acceptance network computing device **16** to complete the transaction with the payee computing device **14** (block #**1** in gray), in this example, the payor computing **12** simultaneously adds block #**1***a* to the "aaa" cryptocurrency blockchain to send the same $10 worth of cryptocurrency "aaa" to a different payee (e.g., "other payee").

[0102] In this example, block #**1***a* is mined by the consensus devices **1**-**10** of the consensus network **36** and eventually receives **10** confirmations (e.g., enough confirmations to confirm the payment to the different payee). Attempting a 51% attack on a proof-of-work blockchain, the payor computing device **12** attempts to mine block #**1** in order to add a longer branch to the "aaa" cryptocurrency blockchain than the block #**1***a* chain. The longest version of the blockchain is considered to be valid by the network consensus rules. Therefore, if payor computing device **12** is successful, the block #**1***a* transaction would receive enough confirmations to be confirmed (e.g., **10** in this example) but then would be abandoned by a self-mined longer branch for block #**1** which would also be confirmed.

[0103] However, mining blocks takes a significant amount of computing power and after a certain amount of time, the payor computing device **12** cannot keep up with other consensus devices in the consensus network **36**. In this example, the payor computing device **12** is able to complete three confirmations of block #**1** in the time it takes the other consensus devices to complete ten confirmations of block #**1***a*. Because the block #**1***a* chain is longer, the consensus network **36** adopts it as correct and the shorter chain for block #**1** is abandoned.

[0104] FIG. **4** is a flowchart of an example of an attempted network attack within the secure & trusted cryptocurrency acceptance system **10**. As described in the example of FIG. **3**, the payor computing device **12** attempts to double spend the $10 worth of cryptocurrency "aaa" on the cryptocurrency "aaa" blockchain **54**. The payor computing device **12**'s attempt to double spend is considered a network attack. The smaller branch for block #**1** is eventually abandoned by the "aaa" blockchain **54**. As such, the cryptocurrency acceptance network computing device **16** does not receive the desired amount of confirmation results at step (**4***a*-**3**) with reference to the method of FIGS. **2**A-**2**C.

[0105] The concurrent steps of (**4***b*-**1**) through (**4***b*-**4**) of FIG. **2**C remain unchanged. However, the method continues with an alternative step (**4***a*-**4**) where the cryptocurrency acceptance network computing device **16** withdraws the "y" amount of Flexacoin from stake account **1**. The information

pertaining to the withdrawal of "y" amount of Flexacoin of stake account **1** is added to the stake pool smart contract and then published to the blockchain. The contract may also include various other information.

[0106] FIGS. **5**A-**5**B are flowcharts of an example of a wallet authorization failure within the secure & trusted cryptocurrency acceptance system **10**. Referring to the method of FIGS. **2**A-**2**D, at some time after step (**4***a*-**2**) and prior to receiving the desired amount of confirmations at step (**4***a*-**3**), in FIG. **5**A, the cryptocurrency acceptance network computing device **16** receives a financial transaction failure notification at alternative step (**4***a*-**3**). For example, the transaction was erroneously authorized via fraud or software malfunction of the network cryptocurrency wallet **46**.

[0107] With the error discovered, the network cryptocurrency wallet **46** sends the financial transaction failure notification and seeks a return of funds. A transaction including information pertaining to return of "$10" worth of "aaa" cryptocurrency to wallet is added to the "aaa" blockchain. For simplicity, the block includes a header section that includes a block number (e.g., block #x) and a transaction section.

[0108] The method of FIG. **5**A continues with an alternative step (**4***a*-**4**) where the cryptocurrency acceptance network computing device **16** withdraws the "y" amount of Flexacoin from stake account **1**. A transaction including information pertaining to withdrawing the "y" amount of Flexacoin from stake account **1** is published to the blockchain. For simplicity, the block includes a header section that includes a block number (e.g., block #**3**) and a transaction section.

[0109] FIG. **5**B operates similarly to FIG. **2**C except that the method continues with an alternative step of (**4***b*-**1**) where the cryptocurrency acceptance network computing device **16** sends the "y" FXC to the cryptocurrency exchange device(s) **18**. The method continues with alternative step (**4***b*-**2**) where the cryptocurrency exchange device (s) **18** convert the "y" FXC to $10. The method continues with step (**4***b*-**3**) where the cryptocurrency exchange device (s) **18** deposit the $10 into a payee banking computing device **56** associated with the payee computing device **14**.

[0110] Alternatively, the cryptocurrency exchange device (s) **18** deposit the $10 into a Flexa banking computing device **55** (e.g., a secure & trusted cryptocurrency acceptance system **10** banking computing device) at step (**4***b*-**3+**) and the Flexa banking computing device **55** deposits the $10 into a payee banking computing device **56** at step (**4***b*-**3**). The method continues with step (**4***b*-**4**) where the payee banking computing device **56** sends a receipt of the deposit of the $10 plus a transaction fee to the cryptocurrency acceptance network computing device **16**. The transaction fee is stored in the transaction fee/rewards pool **80** of the stake pool unit **44** for rewards calculation, conversion into Flexacoin, and distribution.

[0111] FIG. **6** is a schematic block diagram of an embodiment of a stake pool unit **44** of the secure & trusted cryptocurrency acceptance system **10**. The stake pool unit **44** stores a plurality of stake accounts **1**-*n*, includes a stake account manager **52**, and stores a transaction fee/rewards pool **80**. The plurality of stake accounts **1**-*n* store collateral cryptocurrency to secure transactions within the secure & trusted cryptocurrency acceptance system **10**. For example, Flexacoin (FXC) is a token on the Ethereum blockchain created for use as a system specific cryptocurrency within the secure & trusted cryptocurrency acceptance system **10** and is usable as collateral cryptocurrency. In order to be recognized by the secure & trusted cryptocurrency acceptance system **10**, a cryptocurrency wallet must be associated with a stake account that is backed with Flexacoin. An entity that pledges Flexacoin to a stake account is referred to as a staking entity.

[0112] For example, a digital wallet developer creates an account with the cryptocurrency acceptance network computing device **16** in order for its wallet users to be a part of the secure & trusted cryptocurrency acceptance system **10**. As part of the account set up, the digital wallet developer must acquire a certain amount of collateral cryptocurrency into a stake account for purposes of backing the financial transactions of its wallet users.

[0113] For example, the network cryptocurrency wallet **46-1** developer **60-1** has developed the network cryptocurrency wallet **46-1** for use by a plurality of users **1**-*n*. The network cryptocurrency wallet **46-1** developer **60-1** sets up an account with the cryptocurrency acceptance network computing device **16** which includes establishing stake account **1** for purposes of backing the transactions of users of the network cryptocurrency wallet **46-1** (i.e., user **1**-*n*'s network cryptocurrency wallets **46-1**). In this example, the network cryptocurrency wallet **46-1** developer **60-1** purchases and deposits 1000 units of Flexacoin into stake account **1**. Thus, the network cryptocurrency wallet **46-1** developer **60-1** is the network cryptocurrency wallet **46-1** staking entity **58-1**.

[0114] As another example, a network cryptocurrency wallet **46**-*n* developer **60**-*n* has developed the network cryptocurrency wallet **46**-*n* for use by a plurality of users **1**-*n*. The network cryptocurrency wallet **46**-*n* developer **60**-*n* sets up an account with the cryptocurrency acceptance network computing device **16** which includes establishing stake account n for purposes of backing the transactions of users of the network cryptocurrency wallet **46**-*n* (i.e., users **1**-*n*'s network cryptocurrency wallets **46**-*n*). In this example, the network cryptocurrency wallet **46**-*n* developer **60**-*n* purchases and deposits 1900 units of Flexacoin into stake account n. Additionally, an individual (e.g., a user computing device **1**) purchases and deposits 100 units of Flexacoin into stake account n. Thus, the network cryptocurrency wallet **46**-*n* developer **60**-*n* and user computing device **1** are the network cryptocurrency wallet **46**-*n* staking entities **58**-*n*.

[0115] The amount of Flexacoin purchased by a cryptocurrency wallet developer for backing cryptocurrency wallet transactions is based on the amount of users of its cryptocurrency wallet, the amount of anticipated spending by those users, projections of growth, etc. A cryptocurrency wallet should be "over-collateralized" so that its users can spend freely.

[0116] In exchange for pledging Flexacoin, staking entities are provided rewards such as a percentage back on successful transactions completed by their wallet's users. Because of the incentives provided, a variety of staking entities (e.g., individual user computing devices, other wallet developers) may wish to pledge collateral cryptocurrency into one or more stake accounts.

[0117] The stake account manager **52** manages the plurality of stake accounts **1**-*n* and includes an event log **62**, a rewards calculation module **64**, and stake accounts **1**-*n*

information **66** ("info"). The plurality of stake accounts **1**-*n* are "on-chain" smart contracts such as smart contracts on the Ethereum blockchain (i.e., they are visible to everyone) but the stake account manager **52** stores information and conducts activities "off-chain." For example, the stake manager **52** maintains an event log **62** of stake pool activities which includes tracking the total amount of Flexacoin serving as collateral cryptocurrency in the stake pool unit **44** at a given time. In this example, 100,000 units of Flexacoin are serving as collateral cryptocurrency (i.e., FXC pledged to stake accounts **1**-*n*) in the stake pool unit **44**. This entry is featured at the top of the event log **62**.

[0118] The event log **62** further includes entries for stake pool activities such as deposits, withdrawals, holds, etc. In this example, starting with older entries toward the bottom, the event log **62** includes an entry for the network cryptocurrency wallet **46-1** developer **60-1** depositing 1000 FXC into stake account **1**. Next, the event log **62** shows that there was a hold placed on 100 units of FXC in stake account **1** leaving 900 units of FXC available for backing network cryptocurrency wallet **46-1** transactions. The most recent entry in the event log **62** states that the hold was released on the 100 units of FXC in stake account **1**.

[0119] The stake accounts **1**-*n* information **66** stores information pertaining to the stake accounts **1**-*n* such as how much FXC is available for backing transactions associated with each stake account at a particular time. The stake accounts **1**-*n* information **66** further includes rewards percentages per successful transaction, terms of rewards withdrawals, transaction fee rates, etc. For example, payee computing devices may pay different transaction fees for successful transactions completed by different network cryptocurrency wallets. Further, different stake accounts may have different rewards rates and rewards withdrawal preferences.

[0120] While these are all contracted terms established by setting up a stake account and/or the payee computing device **14** accounts with the cryptocurrency acceptance network computing device **16**, it is important to keep these terms confidential. For example, if published, payees (e.g., merchants) would be made aware of what every payee's transaction fee is, thus eliminating the secure & trusted cryptocurrency acceptance system **10**'s ability to contract on different terms. For example, well established merchants may be provided a lower transaction fee as an incentive to join the secure & trusted cryptocurrency acceptance system **10**'s. If that information is public, all payees would demand the same low transaction fee.

[0121] Further, staking entities for one stake account may be provided a different rewards percentage compared to staking entities for another stake account. For example, staking entities of a stake account for a highly reliable and widely used network cryptocurrency wallet may be provided a higher rewards percentage than staking entities of a stake account for a brand new network cryptocurrency wallet with less users. To allow for varying terms, confidential contract terms such as the above examples are stored privately (i.e., not published on the blockchain smart contract) in the stake account manager **52**.

[0122] The rewards calculation module **64** calculates the rewards owed to the staking entities at a given time by accessing the stake accounts **1**-*n* information **66**, the transaction fee/rewards pool **80**, and the event log **62**. For example, the stake accounts **1**-*n* information **66** includes terms for rewards withdrawals. Stake accounts **1**-*n* terms for rewards withdrawals may include one or more of: times of rewards withdrawals (e.g., automated (e.g., once a week), manual, etc.), whether the rewards withdrawals can be on-chain or off-chain, identification of those authorized to initiate a rewards withdrawal, etc. The rewards calculation module **64** is discussed in more detail with reference to FIGS. **8-12**.

[0123] FIG. **7** is a schematic block diagram of an embodiment of a stake account setup. A stake account is a blockchain smart contract such as a smart contract on the Ethereum blockchain. A smart contract is computer code written to a blockchain or similar database implementation, and executable by network users. When an event outlined in the contract is triggered, the code executes. Therefore, a smart contract runs exactly as programmed without any possibility of censorship, downtime, fraud, or third party interference.

[0124] For example, the Ethereum blockchain is a distributed blockchain network that is able to run programming code of any decentralized application through the use of Turing complete software. An Ethereum block includes a header section **68** and a transaction section **70**. The structure of the Ethereum blockchain is similar to the structure of other traditional blockchains such as Bitcoin in that it is a shared record of the entire transaction history. However, an Ethereum block stores not only transactions that have been collected since the last block in the blockchain was mined (like in Bitcoin) but also the recent "state" of each smart contract. A consensus network (i.e., a network of miners) is responsible for shifting the smart contract from state to state. The header section **68** includes these states in a root hash value (i.e., the state root **72**) which summarizes the state changes. The header section **68** further includes other identifying information such as a block number and a hash of a previous block.

[0125] The transaction section **70** in Ethereum includes a nonce (a unique transaction identifier), an address of a recipient account, a value, a sending account's signature, code to be run (e.g., contract code **74**), mining related fields (e.g., start gas and gas price), and possibly some data (e.g., input values for the code). Here, the transaction section **70** is shown as including the contract code **74** for simplicity.

[0126] When a cryptocurrency wallet developer wishes to have a cryptocurrency wallet associated with the secure & trusted cryptocurrency acceptance system **10**, the cryptocurrency wallet developer sets up an account with the cryptocurrency acceptance network computing device **16**. The account set-up includes establishing a stake account for the cryptocurrency wallet. To establish the stake account, a smart contract is written on the Ethereum blockchain beginning with block #**1** of FIG. **7**.

[0127] For simplicity, the stake account creation begins with block #**1** although numerous blocks would proceed this block. The header section **68** of block #**1** includes a state root **72** which includes a current summary of the states of the accounts of the system. Here, state root **72** is empty for simplicity. The transaction section **70** of block #**1** includes contract code **74** which includes code for creating a stake account address for the cryptocurrency wallet and associating the stake account address with contract terms set by the staking entity and the cryptocurrency acceptance network computing device **16**.

[0128] The header section **68** of block #**2** includes a hash of block #**1** and a state root **72**. The state root **72** includes information pertaining to the current state of the stake account. For example, the state root **72** of block #**2** states that the stake account was created for the cryptocurrency wallet (e.g., as block #**1** is mined, the contract code **74** of block #**1** runs). The transaction section **70** of block #**2** includes contract code **74** which includes instructions for making a deposit into the stake account address in accordance with the contract terms. For example, the contract code **74** states that an address owned by the staking entity is in possession of X units of Flexacoin (FXC) to deposit into the stake account address.

[0129] The header section **68** of block #**3** includes a hash of block #**2** and a state root **72**. The state root **72** includes information pertaining to the current state of the stake account. For example, the state root **72** of block #**3** states that the stake account has X units of FXC deposited by the staking entity. The transaction section **70** of block #**3** includes contract code **74** which indicates that the stake account set up is complete.

[0130] FIG. **8** is a schematic block diagram of an embodiment of a stake pool unit **44** of the secure & trusted cryptocurrency acceptance system **10**. The stake pool unit **44** stores a plurality of stake accounts **1**-*n*, includes a stake account manager **52**, and stores a transaction fee/rewards pool **80**. The stake account manager **52** stores stake accounts **1**-*n* information **66** and event log **62** "off-chain." The stake account manager **52** includes a rewards calculation module **64** that is operable to calculate rewards owed to stake accounts **1**-*n* and the staking entities associated with the stake accounts using the privately stored information.

[0131] The stake accounts **1**-*n* information **66** store balance information **76-1** through **76**-*n* with includes how much Flexacoin (FXC) is available for backing transactions, how much FXC is locked due to pending transactions, and how much FXC has been deposited as rewards.

[0132] The stake accounts **1**-*n* information **66** further store rewards information **78-1** through **78**-*n* which includes rewards percentages per successful transaction, terms of rewards withdrawals, transaction fee rates, staking entity rewards percentages, information pertaining to the successful transactions that have occurred per payee at a given time (e.g., T), etc. For example, payees may pay different transaction fees for successful transactions completed by different network cryptocurrency wallets. Further, different payees may pay different transaction fees to the same network cryptocurrency wallets. Rewards information **78-1** through **78**-*n* also includes rewards deposit preferences. Rewards deposit preferences may include one or more of: times of rewards deposits (e.g., automated (e.g., once a week), manual, etc.), one or more triggering events that initiate a rewards deposit, staking entity rewards percentages, etc.

[0133] The stake accounts **1**-*n* information **66** further stores staking entity information **82-1** through **82**-*n* such as identities of staking entities associated with the stake account, staking entity permissions, staking entity FXC withdrawal information (e.g., whether a withdrawal can be on-chain or off-chain, identification of those authorized to initiate a withdrawal, etc.), etc.

[0134] The transaction fee/rewards pool **80** includes deposited transaction fees **84** paid by payees with every successful transaction. In the example shown, there is currently 50 units of deposited transaction fees **84** in the transaction fee/rewards pool **80**. The incoming transaction fees **84** are pooled and used to purchase FXC to distribute as rewards **86**. In the example shown, the rewards balance **86** is 100 FXC. For example, the deposited transaction fees **84** balance was previously higher, but a portion was used to purchase 100 units of FXC. Deposited transaction fees **84** may be converted to FXC for rewards based on a predetermined time (e.g., hourly) and/or a triggering event such as obtaining a certain amount of deposited transaction fees **84**, a particular rewards balance **86** is reached, a rewards distribution is requested, etc. Rewards are pooled in rewards balance **86** until a distribution of rewards occurs.

[0135] The rewards calculation module **64** determines to distribute rewards to the stake accounts **1**-*n* based on one or more of: a predetermined time (i.e., daily, weekly, etc.), a request by a staking entity (e.g., through a stake account withdrawal request), and/or a triggering event. A triggering event includes one or more of: completion of a certain amount of successful transactions, reaching a certain amount of incoming transaction fees, reaching a certain rewards balance **86**, a staking entity contract term, etc. When the rewards calculation module **64** determines to distribute rewards, the rewards calculation module **64** accesses the stake accounts **1**-*n* information **66**, the transaction fee/rewards pool **80**, and the event log **62** to calculate the reward amount owed to each stake account.

[0136] In an example of operation, the rewards calculation module **64** determines to distribute rewards and calculates the rewards owed to stake account **1** at time T. The rewards calculation module **64** accesses one or more of the stake account **1** information **66-1** and the event log to determine that at time T, stake account **1** has backed transactions with payee **1** and payee **2**. As per stake account **1**'s rewards information **76-1**, payee **1** has a 1% per successful transaction fee rate for successful transactions with stake account **1**'s network cryptocurrency wallet and payee **2** has a 2% per successful transaction fee rate for successful transactions with stake account **1**'s network cryptocurrency wallet.

[0137] Further, from the rewards information **78-1**, the rewards calculation module **64** determines that payee **1** has completed 500 units worth of successful transactions with stake account **1**'s network cryptocurrency wallet and payee **2** has completed 200 units worth of successful transactions with stake account **1**'s network cryptocurrency wallet. The rewards calculation module **64** calculates that stake account **1** is owed 5 units of FXC rewards based on payee **1** transactions and 4 units of FXC rewards based on payee **2** transactions. Therefore, from the 100 units of FXC rewards available in the rewards balance **86**, stake account **1** is owed 9 units of FXC.

[0138] The rewards calculation module **64** performs a batched and secure calculation technique on the calculated reward amounts to produce a batched and secure rewards distribution summary. The batched and secure rewards distribution summary ensures that each reward amount is calculated correctly without disclosing the privately stored stake account information.

[0139] For example, the rewards calculations for one or more stake accounts are batched and compressed using a zero knowledge proof calculation. A zero knowledge proof calculation allows for recipients of the proof to verify that a portion is correct without knowing the details of the input calculation. The zero knowledge proof of rewards calculation **88** is used to deposit rewards into stake accounts on a

public blockchain (e.g., into smart contracts on the Ethereum blockchain) without publishing confidential details such as payee transaction fee rates, amount of successful transactions, etc.

[0140] FIG. **9** is a schematic block diagram of an example of a rewards distribution to one or more stake accounts. A stake account is a blockchain smart contract such as a smart contract on the Ethereum blockchain. An Ethereum block includes a header section **68** and a transaction section **70**. The header section **68** includes these states in a root hash value (i.e., the state root **72**) which summarizes the state changes of smart contracts. The header section **68** further includes other identifying information such as a block number and a hash of a previous block.

[0141] The transaction section **70** in Ethereum includes a nonce (a unique transaction identifier), an address of a recipient account, a value, a sending account's signature, code to be run (e.g., contract code **74**), mining related fields (e.g., start gas and gas price), and possibly some data (e.g., input values for the code). Here, the transaction section **70** is shown as including the contract code **74** for simplicity.

[0142] When is it time to distribute rewards into one or more stake accounts (e.g., at a predetermined time (i.e., daily, weekly, etc.), a time based on a certain amount of transactions, a time based on a certain amount of incoming transaction fees, and/or a time based on a request by a staking entity (e.g., through a stake account withdrawal request)) the stake account manager calculates rewards owed and uses a zero knowledge proof of the rewards calculation to deposit rewards to the one or more stake accounts.

[0143] The rewards deposit begins with block #n. The header section **68** of block #n includes a hash of block #n-**1** and a state root **72** which includes a current summary of the states of the accounts of the system. For example, the summary includes current balances of stake accounts of the system. As a specific example, the summary may include that stake account **1** has a balance of 1000 FXC. The transaction section **70** of block #n includes contract code **74** which includes code for adding the rewards to the one or more stake accounts via a batched zero knowledge proof of rewards calculation. For example, the batched zero knowledge proof of rewards calculation includes code to deposit 9 FXC into stake account **1** (using the example of FIG. **8**) as well as the proof itself to prove that the rewards are correct.

[0144] The header section **68** of block #n+1 includes a hash of block #n and a state root **72**. The state root **72** includes information pertaining to the current states of the one or more stake account. For example, the state root **72** of block #n+1 states that the stake account balances were adjusted to include rewards (e.g., stake account **1** now has a balance of 1009 FXC) and that the stake account include the zero knowledge proof of rewards calculation to prove the rewards were calculated correctly. The transaction section **70** of block #n+1 includes contract code **74** which indicates that the rewards deposits are complete.

[0145] FIG. **10** is a schematic block diagram of an embodiment of the stake pool unit **44** of the secure & trusted cryptocurrency acceptance system **10**. The stake pool unit **44** stores a plurality of stake accounts **1**-*n*, includes a stake account manager **52**, and stores a transaction fee/rewards pool **80**. The stake account manager **52** includes stake accounts **1**-*n* information **66**, rewards calculation module **64**, and event log **62**. (e.g., "off-chain"). The stake account manager **52** includes a rewards calculation module **64** that is operable to calculate rewards owed to stake accounts **1**-*n* and the staking entities associated with the stake accounts using the information stored off-chain.

[0146] The stake accounts **1**-*n* information **66** store balance information **76-1** through **76**-*n* with includes how much Flexacoin (FXC) is available for backing transactions, how much FXC is locked due to pending transactions, and FXC deposited as rewards. The stake accounts **1**-*n* information **66** further store rewards information **78-1** through **78**-*n* which includes rewards percentages per successful transaction, terms of rewards withdrawals, transaction fee rates, staking entity rewards percentage, information pertaining to the successful transactions that have occurred per payee at a given time (e.g., T), etc. For example, payees may pay different transaction fees for successful transactions completed by different network cryptocurrency wallets. Further, different payees may pay different transaction fees to the same network cryptocurrency wallets.

[0147] Rewards information **78-1** through **78**-*n* also includes rewards deposit preferences. Rewards deposit preferences may include one or more of: times of rewards deposits (e.g., automated (e.g., once a week), manual, etc.), one or more triggering events that initiate a rewards deposit, staking entity rewards percentages, etc. The stake accounts **1**-*n* information **66** further stores staking entity information **82-1** through **82**-*n* such as identities of staking entities associated with the stake account, staking entity permissions, staking entity withdrawal information **90** (e.g., whether a withdrawal can be on-chain or off-chain, identification of those authorized to initiate a withdrawal, etc.), etc.

[0148] The transaction fee/rewards pool **80** includes deposited transaction fees **84** paid by payees with every successful transaction. In the example shown, there is currently 50 units of deposited transaction fees **84** in the transaction fee/rewards pool **80**. The incoming transaction fees **84** are pooled and used to purchase FXC to distribute as rewards **86**. In the example shown, the rewards balance **86** is 100 FXC. For example, the deposited transaction fees **84** balance was previously higher, but a portion was used to purchase 100 units of FXC. Deposited transaction fees **84** may be converted to FXC for rewards based on a predetermined time (e.g., hourly) and/or a triggering event such as obtaining a certain amount of deposited transaction fees **84**, a particular rewards balance **86** is reached, a rewards distribution is requested, etc. Rewards are pooled in rewards balance **86** until a distribution of rewards occurs.

[0149] As an example, the user computing device **1** requests a withdrawal of rewards owed. With reference to the example of FIG. **6**, stake account n is associated with two staking entities: the network cryptocurrency wallet **46**-*n* developer **60**-*n* and the user computing device **1**. Therefore, in this example, stake account n information is shown. User computing device **1**'s withdrawal request may trigger a rewards distribution to the stake account n. In this example, rewards have already been distributed to the stake account n and the user computing device **1** requests a withdrawal for a portion of those deposited rewards. The distribution of rewards to the stake account n may include calculating a staking entity's portion and where that information is distributed within the zero knowledge proof calculation with the rewards deposit. In another embodiment, the stake

account manager **52** calculates the percentage of rewards owed to a staking entity upon a withdrawal request.

[0150] In response to user computing device **1**'s withdrawal request, the stake account manager **52** accesses the user computing device withdrawal terms **90-2** of stake account n's staking entity information **82-*n***. The staking entity withdrawal information includes one or more of: whether a withdrawal can be on-chain or off-chain, how much can be withdrawn, times of withdrawal, and a type of FXC withdrawal (e.g., rewards, stake, etc.). The request from the user computing device **1** may specify a particular amount or request a withdrawal of total rewards owed. The request may be to withdraw or to send the amount to another address/account.

[0151] If the withdrawal request is within the terms of the user computing device **1** withdrawal terms **90-2**, the stake account manager **52** proceeds with the request by accessing the balance information **76-*n*** and the reward information **78-*n*** to calculate the percentage of rewards owed to the user computing device **1**. Alternatively, the stake account manager **52** previously calculated the percentage of rewards owed to the user computing device **1** during the rewards distribution to stake account n. In that situation, the stake account manager **52** would deposit the rewards according to that calculation.

[0152] When the stake account manager **52** has not previously calculated the percentage of rewards owed to the user computing device **1** during the rewards distribution to stake account n, the stake account manager **52** calculates the percentage owed upon the approval of the request. The stake account manager **52** accesses the balance information **76-*n*** to determine that stake account **1** currently stores 2100 units of FXC, where 1900 units of the 2100 FXC were pledged by the network cryptocurrency wallet **46-*n*** developer **60-*n*,** 100 units of FXC were pledged by the user computing device **1**, and 100 units of FXC have been deposited into stake account n as rewards.

[0153] The stake account manager **52** further accesses the rewards information **78-*n*** to determine that the user computing device **1** awards percentage is 5% of all stake account rewards. The user computing device **1**'s awards percentage is a contracted term based on the amount of FXC pledged to the stake account n. For example, in exchange for depositing 100 FXC in stake account n, the user computing device **1** is offered 5% of stake account rewards in return. Based on the user computing device **1** awards percentage of 5%, the stake account manager **52** determines that the rewards owed are 5 FXC (e.g., 5% of 100 FXC rewards).

[0154] If the withdrawal is authorized as on-chain, the stake account manager **52** publishes the 5 FXC rewards withdrawal made by the user computing device **1**'s account to the blockchain. If the withdrawal is authorized as off-chain, the stake account n balance is updated on-chain with the details of the withdrawal private. For example, the 5 units of FXC is withdrawn from stake account n (on-chain), sent to an internal account not associated with the user computing device **1** (on-chain), converted to US dollars (or other fiat currency), and transferred to a banking account associated with the user computing device **1** (off-chain).

[0155] As another example, the user computing device **1** requests a withdrawal of a specific amount (e.g., 115 FXC). The stake account manager **52** accesses the user computing device withdrawal terms **90-2** to determine whether the user computing device **1** is authorized to make a withdrawal, whether the time of withdrawal is appropriate, and whether the withdrawal can be "on-chain." If the withdrawal request is within the terms of the user computing device withdrawal terms **90-2**, the stake account manager **52** proceeds with the request by accessing the user computing device **1** awards percentage (e.g., 5%) from reward information **78-*n*** and the balance information **76-*n*** to determine the reward balance (e.g., 100 FXC) and the user computing device **1** deposit information.

[0156] Based on the user computing device **1** awards percentage of 5% and the reward balance of 100 FXC, the stake account manager **52** determines that the rewards owed to the user computing device **1** are 5 FXC (e.g., 5% of 100 FXC rewards). The stake account manager **52** further determines that the user computing device **1** has deposited 100 FXC to the stake account n, therefore the maximum withdrawal amount for the user computing device **1** is 105 FXC.

[0157] Because the user computing device **1**'s withdrawal request for 115 FXC is unauthorized, the request is canceled. Alternatively, the stake account manager **52** returns an error message alerting the user computing device to the maximum withdrawal amount possible and queries the user computing device **1** as to whether it would like to adjust the amount requested to be within that amount.

[0158] Alternatively, based on user computing device **1**'s contracted terms, it may not be able to withdraw some or all of its initial deposit. For example, the 100 FXC deposit could be considered "non-refundable" and only rewards withdrawals are possible. As another example, the user computing device **1** may have to wait until a certain amount of rewards (e.g., 20 FXC or more) are available in order to make a withdrawal of rewards.

[0159] FIG. **11** is a schematic block diagram of an "on-chain" stake account withdrawal. A stake account is a blockchain smart contract such as a smart contract on the Ethereum blockchain. An Ethereum block includes a header section **68** and a transaction section **70**. The header section **68** includes these states in a root hash value (i.e., the state root **72**) which summarizes the state changes of smart contracts. The header section **68** further includes other identifying information such as a block number and a hash of a previous block.

[0160] The transaction section **70** in Ethereum includes a nonce (a unique transaction identifier), an address of a recipient account, a value, a sending account's signature, code to be run (e.g., contract code **74**), mining related fields (e.g., start gas and gas price), and possibly some data (e.g., input values for the code). Here, the transaction section **70** is shown as including the contract code **74** for simplicity.

[0161] Referring to the example of FIG. **10** where rewards have previously been deposited into stake account n and the individual staking entity rewards have not been previously calculated, the user computing device **1** requests a withdrawal of rewards owed. The withdrawal request begins with block #x. The header section **68** of block #x includes a hash of block #x-**1** and a state root **72** which includes a current summary of the states of the accounts of the system. For example, the summary includes current balances of stake accounts of the system and zero knowledge proofs of rewards calculations. As a specific example, the summary states that stake account n has a balance of 2100 units of FXC and a zero knowledge proof of rewards calculation to prove that the 100 FXC deposited as rewards were calculated correctly.

[0162] The transaction section **70** of block #x includes contract code **74** which includes code that the user computing device **1** is requesting a withdrawal of rewards from the stake account n and that the stake manager needs to verify user computing device **1**'s withdrawal terms. The stake account manager **52** accesses the user computing device **1** withdrawal terms to determine whether the user computing device is authorized to make a rewards withdrawal, whether the time of withdrawal is appropriate, and whether the withdrawal can be "on-chain."

[0163] The header section **68** of block #x+1 includes a hash of block #x and a state root **72**. The state root **72** includes information pertaining to the current states of the one or more stake account. For example, the state root **72** of block #n+1 states that stake account n has 2100 units of FXC and that user computing device **1**'s withdrawal was verified by the stake account manager.

[0164] The transaction section **70** of block #x+1 includes contract code **74** which indicates that the stake account manager **52** proceeds with the request by calculating the rewards owed to the user computing device **1** and deposits the rewards to the user computing device **1**. To calculate the rewards owed, the stake account manager accesses the user computing device **1** awards percentage from reward information **78**-*n*. Based on the user computing device **1** awards percentage of 5%, the stake account manager **52** determines that the rewards owed are 5 FXC (e.g., 5% of 100 FXC rewards). In this example, the withdrawal is approved for "on-chain" therefore, the 5 units of FXC are deposited to the user computing device **1**.

[0165] The header section **68** of block #x+2 includes a hash of block #x+1 and a state root **72**. The state root **72** includes information pertaining to the current states of the one or more stake accounts. For example, the state root **72** of block #x+2 states that the stake account n balance was adjusted to deduct the rewards owed to the user computing device **1** (e.g., stake account n now has a balance of 2095 FXC) and that the user computing device **1** account now includes the 5 units of FXC. The transaction section **70** of block #x+2 includes contract code **74** which indicates that the withdrawal is complete.

[0166] FIG. **12** is a flowchart of an example of a method of calculating stake account rewards. The method begins with step **92** where a stake account manager (e.g., the rewards calculation module of the stake account manager) of the secure and trusted cryptocurrency acceptance system determines to distribute rewards to one or more stake accounts of a stake pool of the secure and trusted cryptocurrency acceptance system. A stake account of the one or more stake accounts is a smart contract on a blockchain (e.g., the Ethereum blockchain). The stake account is associated with a network cryptocurrency wallet of the secure and trusted cryptocurrency acceptance system. One or more staking entities store system specific cryptocurrency (e.g., Flexacoin (FXC)) in the stake account for purposes of backing financial transactions of the network cryptocurrency wallet within the secure and trusted cryptocurrency acceptance system.

[0167] The stake account manager determines to distribute rewards to the one or more stake accounts based on one or more of: a predetermined time (i.e., daily, weekly, etc.), a request by a staking entity (e.g., through a stake account withdrawal request), and/or a triggering event. A triggering event includes one or more of: completion of a certain amount of successful transactions, reaching a certain amount of incoming transaction fees, reaching a certain rewards balance, a staking entity contract term, etc.

[0168] The method continues with step **94** where the stake account manager obtains privately stored stake account information of the one or more stake accounts and a rewards balance of the stake pool. An amount of transaction fees deposited into the stake pool are converted into the system specific cryptocurrency to produce rewards of the rewards balance. A transaction fee of the amount of transaction fees deposited into the stake pool is deposited into the stake pool based on a successful financial transaction of the secure and trusted cryptocurrency acceptance system.

[0169] The privately stored stake account information includes balance information, rewards information, staking entity information, and an event log. The balance information includes how much system specific cryptocurrency is available for backing transactions, how much system specific cryptocurrency is locked due to pending transactions, and how much system specific cryptocurrency is deposited as rewards. The rewards information includes rewards percentages per successful transaction, terms of rewards withdrawals, transaction fee rates, staking entity rewards percentage, information pertaining to the successful transactions that have occurred per payee at a given time (e.g., T), etc. For example, payees may pay different transaction fees for successful transactions completed by different network cryptocurrency wallets. Further, different payees may pay different transaction fees to the same network cryptocurrency wallets.

[0170] Rewards information also includes rewards deposit preferences. Rewards deposit preferences may include one or more of: times of rewards deposits (e.g., automated (e.g., once a week), manual, etc.), one or more triggering events that initiate a rewards deposit, staking entity rewards percentages, etc. Staking entity information includes identities of staking entities associated with the stake account, staking entity permissions, staking entity withdrawal information (e.g., whether a withdrawal can be on-chain or off-chain, identification of those authorized to initiate a withdrawal, etc.), etc.

[0171] The method continues with step **96** where the stake account manager calculates a reward amount of the rewards balance owed to each stake account of the one or more stake accounts based on the privately stored stake account information. For example, the stake account manager accesses the privately stored stake account information to determine that at time T, a stake account has backed transactions with a first payee and a second payee. As per the stake account's rewards information, the first payee has a 1% per successful transaction fee rate for successful transactions with the stake account's network cryptocurrency wallet and the second payee has a 2% per successful transaction fee rate for successful transactions with stake account's network cryptocurrency wallet.

[0172] Further, from the rewards information, the stake account manager determines that the first payee has completed 500 units worth of successful transactions with the stake account's network cryptocurrency wallet and the second payee has completed 200 units worth of successful transactions with stake account's network cryptocurrency wallet. The stake account manager calculates that the stake account is owed 5 units of FXC rewards based on first payee transactions and 4 units of FXC rewards based on second

payee transactions. Therefore, the stake account is owed 9 units of FXC. The stake account manager calculates rewards for other stake accounts similarly. The calculations may further include the steps of determining how much each staking entity of a stake account is owed.

[0173] The method continues with step **98** where the stake account manager performs a batched and secure calculation technique on the calculated reward amounts to produce a batched and secure rewards distribution summary. The batched and secure rewards distribution summary ensures that each reward amount is calculated correctly without disclosing the privately stored stake account information. For example, the rewards calculations for one or more stake accounts are batched and compressed using a zero knowledge proof calculation. A zero knowledge proof calculation allows for recipients of the proof to verify that a portion is correct without knowing the details of the calculation.

[0174] The method continues with step **100** where the stake account manager publishes the batched and secure rewards distribution summary to the blockchain. The publishing deposits the calculated rewards into stake accounts (e.g., into smart contracts on the Ethereum blockchain) without publishing confidential details such as payee transaction fee rates, amount of successful transactions, etc.

[0175] FIG. **13** is a schematic block diagram of another embodiment of the secure & trusted cryptocurrency acceptance system **10** that includes a payor computing device **12**, a foreign payee computing device **102**, a cryptocurrency acceptance network computing device **16**, one or more domestic cryptocurrency exchange device(s) **18-1**, one or more foreign cryptocurrency exchange device(s) **18-2**, a database **20**, and a consensus network **36** that includes a plurality of consensus devices **1**-*n*.

[0176] The secure & trusted cryptocurrency acceptance system **10** of FIG. **13** operates similarly to the secure & trusted cryptocurrency acceptance system **10** of FIG. **1** except that the secure & trusted cryptocurrency acceptance system **10** of FIG. **13** enables secure and trusted financial transactions between a payor computing device **12** paying with a cryptocurrency and a foreign payee computing device **102** accepting a desired currency (e.g., foreign fiat currency). The one or more foreign cryptocurrency exchange device(s) **18-2** are located in the same jurisdiction as the foreign payee computing device **102**.

[0177] The foreign payee computing device **102** may be one or more computing devices having an affiliation with a specific merchant identifier (ID). For example, the foreign payee computing device **102** is a point of sale (POS) device in a foreign retail store associated with a particular merchant having the specific merchant ID. The foreign payee computing device **102** is associated with the cryptocurrency acceptance network computing device **16**. For example, the foreign payee computing device **102** has an account with the cryptocurrency acceptance network computing device **16**. The account setup establishes data application "c" **42** in the foreign payee computing device **102**'s memory **30** and includes instructions for securely receiving payments via the secure & trusted cryptocurrency acceptance system **10**.

[0178] The one or more domestic cryptocurrency exchange device(s) **18-1** and the one or more foreign cryptocurrency exchange device(s) **18-2** are specially licensed entities operable to convert cryptocurrency to a desired currency (e.g., fiat currency, another cryptocurrency, etc.). In an embodiment, the one or more domestic cryptocurrency exchange device(s) **18-1** and the one or more foreign cryptocurrency exchange device(s) **18-2** are associated with one or more cryptocurrency holding companies that are specially licensed to store sensitive materials and have insurance policies to protect against theft and fraud. In another embodiment, one or more domestic cryptocurrency exchange device(s) **18-1** and the one or more foreign cryptocurrency exchange device(s) **18-2** are standalone secure devices.

[0179] Licensing, rules, and regulations for cryptocurrency exchange occurs jurisdictionally meaning some cryptocurrencies may be exchangeable for other currencies in one jurisdiction (e.g., a country) but not recognized for exchange in another. For example, Ether (the cryptocurrency of the Ethereum blockchain) may be exchanged for US dollars in the United States but outside of the United States it may not be accepted for exchange into a foreign fiat currency. Likewise, the United States may not have cryptocurrency exchange devices licensed to exchange certain foreign cryptocurrencies for US dollars or other cryptocurrencies.

[0180] In order for a payor computing device **12** to conduct financial transactions across jurisdictions, the secure & trusted cryptocurrency acceptance system **10** implements a universally accepted cryptocurrency settlement layer to process financial transactions.

[0181] In an example of operation, the payor computing device **12** establishes a direct communication link with the foreign payee computing device **102** via the direct communication link **32**. The payor computing device **12** sends the foreign payee computing device **102** a request to initiate purchase of a product or service using cryptocurrency stored in the network cryptocurrency wallet **46**. The cryptocurrency stored in the network cryptocurrency wallet **46** is not recognized by the foreign cryptocurrency exchange device (s) **18-2** for exchange. The foreign payee computing device **102** accepts a desired currency (e.g., a foreign fiat currency, etc.).

[0182] The request to initiate purchase may be in the form of a split bar code, where the payor computing device **12** maintains one portion of a bar code and the foreign payee computing device **102** maintains another portion of a bar code such that when they are aligned in close proximity, the conveyance is initiated. Having a correct piece of a barcode from the payor computing device **12** as well as the act of alignment, demonstrates intent to enter into a financial transaction (i.e., user authorization). As another example, the request is a secure handshake protocol between the payor computing device **12** and foreign payee computing device **102**.

[0183] When the request to initiate the financial transaction is approved by the foreign payee computing device **102** (e.g., via the split bar code example), the payor computing device **12** receives an acknowledgement of the financial transaction (e.g., a one-time use code such as a transaction ID) from the foreign payee computing device **102**. The one-time use code is one or more of: a unique number, an alpha numeric, a function, and/or any item that uniquely connects the parties in the transaction to the particular transaction. For example, the foreign payee computing device **102** approves the request when the foreign payee computing device **102** is affiliated with the cryptocurrency acceptance network computing device **16**, the payor com-

puting device **12** is a trusted computing device (e.g., by verification of ID, certificate, etc.), etc.

[0184] When a financial transaction is initiated by the payor computing device **12** using the network cryptocurrency wallet **46**, the cryptocurrency acceptance network computing device **16** receives an acknowledgment of the initiation of the financial transaction and a request to process the financial transaction. For example, the payor computing device **12** sends the request to process the financial transaction plus the one-time use code to the cryptocurrency acceptance network computing device **16**. The cryptocurrency acceptance network computing device **16** places a hold on an amount of collateral cryptocurrency in a stake account of the stake pool unit **44** associated with the network cryptocurrency wallet **46**.

[0185] When the amount of collateral cryptocurrency is placed on hold, the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** an acknowledgment that the requisite amount of collateral cryptocurrency is on hold and the financial transaction can proceed. The payor computing device **102** is provided real time exchange rate information for the cryptocurrency to the desired currency requested by the foreign payee computing device **102**.

[0186] The payor computing device **12** sends an amount of cryptocurrency equal to the amount of desired currency requested by the foreign payee computing device **102** to the cryptocurrency acceptance network computing device **16**. Sending the amount of cryptocurrency equal to the amount of desired currency requested by the foreign payee computing device **102** to the cryptocurrency acceptance network computing device **16** is a transaction added to the cryptocurrency blockchain of the cryptocurrency used by the payor computing device **12**.

[0187] Alternatively, or additionally, the foreign payee computing device **102** sends a notice of the financial transaction which includes the amount of desired currency requested (e.g., an amount of foreign fiat currency) to the cryptocurrency acceptance network computing device **16**. The cryptocurrency acceptance network computing device **16** sends the payor computing device **12** a network transaction acknowledgement that the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold.

[0188] Alternatively, when the amount of desired currency requested is more than the amount of collateral cryptocurrency on hold, the cryptocurrency acceptance network computing device **16** may place further collateral cryptocurrency on hold equal to the amount of desired currency requested if allowed (e.g., by the terms of the stake account associated with the network cryptocurrency wallet **46**). If not allowed, the cryptocurrency acceptance network computing device **16** cancels the transaction before the transaction is finalized between the payor computing device **12** and the foreign payee computing device **102**.

[0189] The payor computing device **12** sends the foreign payee computing device **102** a notification to finalize the transaction. The notification to finalize the transaction includes the network transaction acknowledgement information from the cryptocurrency acceptance network computing device **16** (e.g., the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold) such that the foreign payee computing device **102** can close the financial transaction knowing that the desired funds will arrive.

[0190] The cryptocurrency acceptance network computing device **16** seeks a desired number of confirmations of payor computing device **12**'s cryptocurrency payment from the consensus network **20**. The desired number of confirmations corresponds to the type of cryptocurrency used. Receipt of the desired number of confirmations may take minutes to hours of time.

[0191] The cryptocurrency acceptance network computing device **16** adjusts the amount of collateral cryptocurrency on hold to equal the amount of desired currency requested when the amount of desired currency requested is less than the amount of collateral cryptocurrency on hold.

[0192] Concurrently to seeking desired confirmations, the cryptocurrency acceptance network computing device **16** sends the amount of cryptocurrency sent by the payor computing device **12** to the domestic cryptocurrency exchange device(s) **18-1**. The domestic cryptocurrency exchange device(s) **18-1** convert the amount of cryptocurrency sent by the payor computing device **12** to an amount of universally accepted cryptocurrency equal to the amount of desired currency requested by the foreign payee computing device **102**.

[0193] The universally accepted cryptocurrency is a cryptocurrency that is accepted and recognized for exchange by all cryptocurrency exchanges associated with the secure & trusted cryptocurrency acceptance system **10**. For example, the universally accepted cryptocurrency is Bitcoin (BTC). Converting cryptocurrency to a universally accepted cryptocurrency allows a payor computing device to transact with payee computing devices across jurisdictions with varying laws and regulations regarding cryptocurrencies. The domestic cryptocurrency exchange device(s) **18-1** send the amount of universally accepted cryptocurrency equal to the amount of desired currency to the foreign cryptocurrency exchange device(s) **18-2**.

[0194] The foreign cryptocurrency exchange device(s) **18-2** are located in the same jurisdiction as the foreign payee computing device **102** and convert the amount of universally accepted cryptocurrency to the amount of desired requested by the foreign payee computing device **102**. Cryptocurrency exchange is done quickly (e.g., 30 seconds to a few minutes) to account for exchange rate volatility. The foreign cryptocurrency exchange device(s) **18-2** deposit the amount equal to the amount of desired currency requested by the foreign payee computing device **102** into a foreign payee banking computing device associated with the foreign payee computing device **102**.

[0195] When the desired number of confirmations are received by the cryptocurrency acceptance network computing device **16** from the consensus network **36**, the cryptocurrency acceptance network computing device **16** releases the hold on the amount of collateral cryptocurrency. If fraudulent activity occurs (e.g., the payor computing device acts maliciously to spend at two payee computing devices simultaneously, the software of the network cryptocurrency wallet **46** is corrupted, etc.) the cryptocurrency acceptance network computing device **16** withdraws the collateral cryptocurrency on hold from the stake account.

[0196] As another example, if the payor computing device **12** sends an unauthorized cryptocurrency payment to the cryptocurrency acceptance network computing device **16** through an error in the software of the network cryptocur-

rency wallet **46**, the error may be recognized by the payor computing device **12**'s network cryptocurrency wallet **46** after finalization of the transaction with the foreign payee computing device **102** but prior to the cryptocurrency acceptance network computing device **16** receiving the desired amount of confirmations.

[0197] In that situation, the network cryptocurrency wallet **46** sends a financial transaction failure notification to the cryptocurrency acceptance network computing device **16**, the amount of cryptocurrency spent is requested back, and the cryptocurrency acceptance network computing device **16** withdraws the amount of collateral cryptocurrency on hold to cover the transaction that occurred with the foreign payee computing device **102**. The universally accepted cryptocurrency settlement layer will be discussed in more detail with reference to FIGS. **14A-16**.

[0198] FIGS. **14A-14C** are flowcharts of an example of a method of a financial transaction of the secure & trusted cryptocurrency acceptance system **10** of FIG. **13**. The method begins on FIG. **14A** with step (**1***a*) where the payor computing device **12** establishes a direct communication link with the foreign payee computing device **102** to initiate a financial transaction. The payor computing device **12**'s network cryptocurrency wallet **46** is storing 100 units of a cryptocurrency (CC) "aaa." Cryptocurrency "aaa" may be any type of cryptocurrency approved for exchange by the one or more domestic cryptocurrency exchange device(s) **18-1**. In this example, the payor computing device **12** wishes to pay the foreign payee computing device **102** using cryptocurrency "aaa," but the foreign payee computing device **102** accepts foreign fiat currency (e.g., Canadian dollars). Further, the one or more foreign cryptocurrency exchange device(s) **18-2** in the jurisdiction of the foreign payee computing device **102** do not recognize cryptocurrency "aaa" for exchange.

[0199] The request to initiate purchase at step (**1***a*) may be in the form of a split bar code, where the payor computing device **12** maintains one portion of a bar code and the foreign payee computing device **102** maintains another portion of a bar code such that when they are aligned in close proximity, the conveyance is initiated. Having a correct piece of a barcode from the payor computing device **12** as well as the act of alignment, demonstrates intent to enter into a financial transaction (i.e., user authorization). As another example, the request is a secure handshake protocol between the payor computing device **12** and the foreign payee computing device **102**.

[0200] The method continues at step (**1***b*) where the payor computing device **12** receives an acknowledgement of the financial transaction (e.g., a one-time use code such as a transaction ID) from the foreign payee computing device **102**. The one-time use code is one or more of: a unique number, an alpha numeric, a function, and/or any item that uniquely connects the parties in the transaction to the particular transaction. For example, the foreign payee computing device **102** approves the request when the foreign payee computing device **102** is associated with the cryptocurrency acceptance network computing device **16** and the terms of the transaction are valid.

[0201] The method continues at step (**2***a*) where, when a financial transaction is initiated by the payor computing device **12** using the network cryptocurrency wallet **46**, the cryptocurrency acceptance network computing device **16** receives an acknowledgment of the initiation of the financial transaction and a request to process the financial transaction. For example, the payor computing device **12** sends the request to process the financial transaction plus the one-time use code to the cryptocurrency acceptance network computing device **16**.

[0202] The cryptocurrency acceptance network computing device **16** includes the stake pool unit **44**. The stake pool unit **44** includes a plurality of stake accounts **1**-*n*. Staking entities (e.g., wallet developers, individuals, etc.) pledge an amount of Flexacoin (FXC) cryptocurrency to a stake account for purposes of backing financial transactions of a cryptocurrency wallet's users (i.e., collateral cryptocurrency). Flexacoin cryptocurrency is a token on the Ethereum blockchain developed specifically for use within the secure & trusted cryptocurrency acceptance system **10** as a collateral utility token. A more detailed discussion of the stake pool unit **44** and the plurality of stake accounts **1**-*n* is disclosed with reference to FIGS. **6-12**.

[0203] In order for a cryptocurrency wallet to be recognized by the secure & trusted cryptocurrency acceptance system **10**, the cryptocurrency wallet must be associated with a stake account of the stake pool unit **44**. In this example, the network cryptocurrency wallet **46** is associated with stake account **1**. For example, the digital wallet developer of the network cryptocurrency wallet **46** and possibly one or more other staking entities have deposited 1000 units of Flexacoin in stake account **1** to back financial transactions of users of the network cryptocurrency wallet **46**.

[0204] At step (**2***b*), the cryptocurrency acceptance network computing device **16** places a hold on an amount of Flexacoin in stake account **1**. In this example, 100 units of cryptocurrency "aaa" worth of Flexacoin (e.g., the total amount of cryptocurrency stored in the network cryptocurrency wallet **46**) of the 1000 units of amount of Flexacoin in the stake account **1** is placed on hold to back the financial transaction. The 100 units of cryptocurrency "aaa" worth of Flexacoin is referred to as "X" amount of Flexacoin for simplicity.

[0205] For example, if cryptocurrency "aaa" and Flexacoin have a one-to-one conversion, "X" equals 100 units and there is now 900 units of Flexacoin available in stake account **1** to back financial transactions of other users of the network cryptocurrency wallet **46**. The information pertaining to the hold on "X" amount of Flexacoin of stake account **1** is added to the stake pool smart contract. Transactions within the smart contract include the data required to publish the state of the stake pool transactions to the blockchain. The contract may also include various other information.

[0206] The method continues with step (**2***c*), where, when the "X" amount of Flexacoin is placed on hold, the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** an acknowledgment that the requisite amount of collateral cryptocurrency is on hold and the financial transaction can proceed. If the requisite amount of collateral cryptocurrency cannot be placed on hold (e.g., the stake account does not have enough collateral cryptocurrency available) the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** an error notification and cancels the financial transaction at step (**2***c*).

[0207] The method continues with step (**3***a*) where the payor computing device **12** sends the amount of cryptocurrency "aaa" equal to the amount of foreign fiat currency requested by the foreign payee computing device **102** to the

cryptocurrency acceptance network computing device **16**. In this example, the foreign payee computing device **102** is requesting 10 Canadian dollars (CAD). A block including information pertaining to transfer of "10 CAD" worth of "aaa" cryptocurrency is added to the "aaa" blockchain. The block includes a header section and a transaction section. The header section includes a block number (e.g., block #y) plus a hash of the previous block (not shown). The header section and/or the transaction section may include various other information.

[0208] The transaction information of the block includes the payment amount, the address of the sender (the payor computing device **12**), and the address of the recipient (the cryptocurrency acceptance network computing device **16**). Thus, by using the secure & trusted cryptocurrency acceptance system **10**, confidential payee related information (e.g., revenue, items being sold, consumer spending behavior, etc.) and confidential payor related information (e.g., consumer identity, items purchased, amount spent, merchants frequented, etc.) is private (i.e., not published on the blockchain for anyone to see).

[0209] Alternatively, or additionally, the foreign payee computing device **102** sends a notice of the financial transaction which includes the amount of desired currency requested (e.g., an amount of Canadian dollars) to the cryptocurrency acceptance network computing device **16** at step (**3***a*+). The method continues with step **3**(*b*) where the cryptocurrency acceptance network computing device **16** sends the payor computing device **12** a network transaction acknowledgement that the amount of cryptocurrency received is covered by the amount of collateral cryptocurrency placed on hold.

[0210] Alternatively, if the amount of cryptocurrency received is not covered by the amount of collateral cryptocurrency placed on hold, the cryptocurrency acceptance network computing device **16** may cancel the transaction at **3**(*b*) or place a further amount of Flexacoin on hold to cover the transaction at **3**(*b*) depending on the terms of stake account **1**.

[0211] In this example, the entire balance of the network cryptocurrency wallet **46** worth of Flexacoin is placed on hold so the payor computing device **12** would not be able to spend more than the amount placed on hold. However, in other examples where the amount of collateral cryptocurrency placed on hold is based on other factors (e.g., merchant ID, typical transaction amounts, etc.), the payor computing device **12** may initiate a transaction for more than what is placed on hold. The terms of the stake account **1** indicate how to proceed in such cases. For example, the stake account **1** may indicate that a user of the network cryptocurrency wallet **46** has a particular spending cap on any individual purchase. Any request that requires a hold on over the spending cap is rejected. However, for a request equal to or lower than the spending cap, additional collateral cryptocurrency is placed on hold so that the transaction can proceed.

[0212] The method continues with step **3**(*c*) where the payor computing device **12** sends the foreign payee computing device **102** a notification to finalize the transaction. The notification to finalize the transaction includes the network transaction acknowledgement information from the cryptocurrency acceptance network computing device **16** (e.g., the amount of cryptocurrency has been received and is covered by the amount of collateral cryptocurrency placed on hold) such that the foreign payee computing device **102** can close the financial transaction knowing that the desired funds will arrive.

[0213] The method continues on FIG. **14**B with step (**4***a*-**1**) where the cryptocurrency acceptance network computing device **16** seeks a desired number of confirmations of block #y added to the "aaa" blockchain **54** from the consensus network **36**. The consensus network **36** includes a plurality of consensus devices **1**-*n*. For example, in the Bitcoin blockchain, miners record new transactions into blocks that verify all previous transactions within the blockchain. On average, it takes a miner ten minutes to write a block on the Bitcoin blockchain and the average block time depends on a total hash power of the Bitcoin network.

[0214] The desired number of confirmations corresponds to the type of cryptocurrency used. As shown here, the cryptocurrency acceptance network computing device **16** requires "n" confirmations before block #**1** on the "aaa" blockchain **54** is considered confirmed. Receipt of the desired number of confirmations may take minutes to hours of time. However, because every financial transaction is backed with Flexacoin as collateral, the cryptocurrency acceptance network computing device **16** proceeds with the financial transaction and trusts that the desired amount of confirmations will be received.

[0215] The method continues at step (**4***a*-**2**) where the cryptocurrency acceptance network computing device **16** adjusts the X amount of Flexacoin on hold to equal 10 CAD worth of Flexacoin. 10 CAD worth of Flexacoin is referred to as "y" amount of Flexacoin for simplicity. For example, when the conversion rate between Flexacoin and Canadian dollars is one-to-one, and X is equal to 100, the cryptocurrency acceptance network computing device **16** releases the hold on 90 units of Flexacoin (i.e., "X-y") such that only 10 units of Flexacoin are on hold. The information pertaining to releasing the hold on "X-y" amount of Flexacoin of stake account **1** is added to the stake pool smart contract. Transactions within the smart contract include the data required to publish the state of the stake pool transactions to the blockchain. The contract may also include various other information.

[0216] The method continues with step (**4***a*-**3**) where the desired number of confirmations are received by the cryptocurrency acceptance network computing device **16** from the consensus network **36**. The method continues with step (**4***a*-**4**) where the cryptocurrency acceptance network computing device **16** releases the hold on the "y" amount of Flexacoin of stake account **1**. A block including information pertaining to releasing the hold on "y" amount of Flexacoin of stake account **1** is added to the Flexacoin blockchain. For simplicity, the block includes a header section that includes a block number (e.g., block #y+2) and a transaction section.

[0217] Concurrently with seeking desired confirmations in step (**4***a*-**2**) on FIG. **14**B, the method continues with step (**4***b*-**1**) on FIG. **14**C where the cryptocurrency acceptance network computing device **16** sends the 10 CAD worth of cryptocurrency "aaa" sent by the payor computing device **12** to the domestic cryptocurrency exchange device(s) **18-1**. The method continues with step (**4***b*-**2**) where the domestic cryptocurrency exchange device(s) **18-1** convert the 10 CAD worth of cryptocurrency "aaa" sent by the payor computing device **12** to a universally accepted cryptocurrency. For example, the universally accepted cryptocurrency is Bitcoin (BTC).

[0218] The method continues with step (**4***b*-**3**) where the domestic cryptocurrency exchange device(s) **18-1** sends the 10 CAD worth of universally accepted cryptocurrency (BTC) to the foreign cryptocurrency exchange device(s) **18-2**. The method continues with step (**4***b*-**4**) where the foreign cryptocurrency exchange device(s) **18-2** convert the 10 CAD worth of universally accepted cryptocurrency (BTC) to 10 CAD. Cryptocurrency exchange is done quickly (e.g., seconds to a few minutes) to account for exchange rate volatility. The exchange can also be performed in real time on a credit-based account to eliminate any pricing volatility. Further, the payor computing device **12** is made are aware of the exchange rate for "aaa" CC to Canadian dollars in real time.

[0219] The method continues with step (**4***b*-**5**), where the foreign cryptocurrency exchange device(s) **18-2** deposit the 10 CAD into a foreign payee banking computing device **104** associated with the foreign payee computing device **102**. Alternatively, the foreign cryptocurrency exchange device (s) **18-2** deposit the 10 CAD into a Flexa banking computing device **55** (e.g., a secure & trusted cryptocurrency acceptance system **10** banking computing device) and the Flexa banking computing device **55** deposits the 10 CAD into the foreign payee banking computing device **104**. The method continues with step (**4***b*-**6**) where the foreign payee banking computing device **104** sends a receipt of the deposit of the 10 CAD plus a transaction fee to the cryptocurrency acceptance network computing device **16**. The transaction fee is stored in the transaction fee/rewards pool **80** of the stake pool unit **44** for rewards calculation and distribution.

[0220] FIG. **15** is a schematic block diagram of an embodiment of a worldwide network of cryptocurrency exchange devices of the secure & trusted cryptocurrency acceptance system **10** that includes cryptocurrency exchange devices **1-5** located in jurisdictions **1-5**. A cryptocurrency exchange device is operable to convert one or more cryptocurrencies to other currencies (e.g., fiat currencies or other cryptocurrencies). Licensing, rules, and regulations for cryptocurrency exchange occurs jurisdictionally meaning some cryptocurrencies may be exchangeable for other currencies in one jurisdiction (e.g., a country) but not recognized for exchange in another.

[0221] For example, in jurisdiction **1**, cryptocurrency exchange device **1** recognizes and is operable to convert the following currencies: "aaa" cryptocurrency (CC), "bbb" cryptocurrency (CC), local fiat currency, and Bitcoin (BTC). In jurisdiction **2**, cryptocurrency exchange device **2** recognizes and is operable to convert the following currencies: "aaa" cryptocurrency (CC), "ddd" cryptocurrency (CC), local fiat currency, and Bitcoin (BTC). In jurisdiction **3**, cryptocurrency exchange device **3** recognizes and is operable to convert the following currencies: "abc" cryptocurrency (CC), "eee" cryptocurrency (CC), local fiat currency, and Bitcoin (BTC). In jurisdiction **4**, cryptocurrency exchange device **4** recognizes and is operable to convert the following currencies: "aaa" cryptocurrency (CC), "ggg" cryptocurrency (CC), local fiat currency, and Bitcoin (BTC). In jurisdiction **5**, cryptocurrency exchange device **5** recognizes and is operable to convert the following currencies: "bbb" cryptocurrency (CC), "edd" cryptocurrency (CC), "xyz" cryptocurrency (CC), local fiat currency, and Bitcoin (BTC).

[0222] While there is some overlap in the what currencies are recognized across jurisdictions (e.g., jurisdictions **1**, **2**, and **4** recognize "aaa" CC), a problem occurs when a payor from one jurisdiction wishes to transact with a payee in another jurisdiction using a currency that is not recognized for exchange in the payee's jurisdiction. For example, a payor from jurisdiction **5** wishes to pay a payee from jurisdiction **1** using "xyz" CC. Cryptocurrency exchange device **1** does not recognize or accept "xyz" CC for exchange.

[0223] To solve this problem, when a financial transaction occurs between a payor using a cryptocurrency and a payee in a jurisdiction that cannot exchange the cryptocurrency, the cryptocurrency exchange device in the payor's jurisdiction first converts the cryptocurrency to a universally accepted cryptocurrency (e.g., Bitcoin (BTC)). A cryptocurrency exchange in the payee's jurisdiction is then operable to convert the universally accepted cryptocurrency to the desired currency of the payee. For example, the cryptocurrency exchange device **5** converts the "xyz" CC to universally accepted cryptocurrency BTC and sends the BTC to the cryptocurrency exchange device **1**. The cryptocurrency exchange device **1** converts the BTC to the desired currency of the payee (e.g., local fiat currency).

[0224] This multiple-step conversion is referred to as a universally accepted cryptocurrency settlement layer of the secure & trusted cryptocurrency acceptance system **10**. The universally accepted cryptocurrency settlement layer is shown here as the arrows between jurisdictions indicating that a universally accepted cryptocurrency (e.g., Bitcoin (BTC)) can be exchanged across jurisdictions **1-5** for conversion to whatever currencies are accepted by a particular jurisdiction. The universally accepted cryptocurrency settlement layer allows for fast, trusted, and secure cryptocurrency transactions worldwide.

[0225] As long as a jurisdiction has a cryptocurrency exchange that is associated with the secure & trusted cryptocurrency acceptance system **10** (e.g., via an account with the cryptocurrency acceptance network device **16**) that accepts the universally accepted cryptocurrency for exchange, cryptocurrency financial transactions initiated using unrecognized/foreign cryptocurrencies can occur there.

[0226] FIG. **16** is a schematic block diagram of another embodiment of the secure & trusted cryptocurrency acceptance system **10** that includes a domestic payor computing device **12**, the cryptocurrency acceptance network computing device **16**, one or more domestic cryptocurrency exchange device(s) **18-1**, a plurality of domestic payees computing devices **14-1** through **14-***n*, a plurality of domestic payee banking devices **56-1** through **56-***n*, one or more foreign cryptocurrency exchange device(s) **18-2**, a plurality of foreign payee computing devices **102-1** through **102-***n*, and a plurality of foreign payee banking computing devices **104-1** through **104-***n*.

[0227] The cryptocurrency acceptance network computing device **16** is associated with the domestic payor computing device **12**, the one or more domestic cryptocurrency exchange device(s) **18-1**, the one or more domestic cryptocurrency exchange device(s) **18-1**, the plurality of domestic payees computing devices **14-1** through **14-***n*, the plurality of domestic payee banking devices **56-1** through **56-***n* the plurality of foreign cryptocurrency exchange devices **1-***n*, the plurality of foreign payee computing devices **1-***n*, and the plurality of foreign payee banking computing devices **1-***n*.

[0228] The network created by the cryptocurrency acceptance network computing device **16** associations allows for the domestic payor computing device **12** to engage in fast, easy, and reliable financial transactions with domestic payee computing devices and foreign payee computing devices. This is achieved through the universally accepted cryptocurrency settlement layer discussed in FIGS. **13-15**.

[0229] While engaging in financial transactions outside of the domestic payor computing device **12**'s country with one or more of the foreign payee devices **102-1** through **102-*n***, the domestic payor computing device **102** is provided real time exchange rates through the connection of the domestic and foreign cryptocurrency exchange devices via the cryptocurrency acceptance network computing device **16**.

[0230] The methods of the secure & trusted cryptocurrency acceptance system **10** (e.g., the stake pool, the universally accepted cryptocurrency settlement layer, etc.) allow for replicability and scalability of the secure & trusted cryptocurrency acceptance system **10** across a plurality of jurisdictions worldwide.

[0231] As may also be used herein, the term(s) "configured to", "operably coupled to", "coupled to", and/or "coupling" includes direct coupling between items and/or indirect coupling between items via an intervening item (e.g., an item includes, but is not limited to, a component, an element, a circuit, and/or a module) where, for an example of indirect coupling, the intervening item does not modify the information of a signal but may adjust its current level, voltage level, and/or power level. As may further be used herein, inferred coupling (i.e., where one element is coupled to another element by inference) includes direct and indirect coupling between two items in the same manner as "coupled to".

[0232] As may even further be used herein, the term "configured to", "operable to", "coupled to", or "operably coupled to" indicates that an item includes one or more of power connections, input(s), output(s), etc., to perform, when activated, one or more its corresponding functions and may further include inferred coupling to one or more other items. As may still further be used herein, the term "associated with", includes direct and/or indirect coupling of separate items and/or one item being embedded within another item.

[0233] As may be used herein, the term "compares favorably", indicates that a comparison between two or more items, signals, etc., provides a desired relationship. For example, when the desired relationship is that signal **1** has a greater magnitude than signal **2**, a favorable comparison may be achieved when the magnitude of signal **1** is greater than that of signal **2** or when the magnitude of signal **2** is less than that of signal **1**. As may be used herein, the term "compares unfavorably", indicates that a comparison between two or more items, signals, etc., fails to provide the desired relationship.

[0234] As may be used herein, one or more claims may include, in a specific form of this generic form, the phrase "at least one of a, b, and c" or of this generic form "at least one of a, b, or c", with more or less elements than "a", "b", and "c". In either phrasing, the phrases are to be interpreted identically. In particular, "at least one of a, b, and c" is equivalent to "at least one of a, b, or c" and shall mean a, b, and/or c. As an example, it means: "a" only, "b" only, "c" only, "a" and "b", "a" and "c", "b" and "c", and/or "a", "b", and "c".

[0235] As may also be used herein, the terms "processing module", "processing circuit", "processor", "processing circuitry", and/or "processing unit" may be a single processing device or a plurality of processing devices. Such a processing device may be a microprocessor, micro-controller, digital signal processor, microcomputer, central processing unit, field programmable gate array, programmable logic device, state machine, logic circuitry, analog circuitry, digital circuitry, and/or any device that manipulates signals (analog and/or digital) based on hard coding of the circuitry and/or operational instructions. The processing module, module, processing circuit, processing circuitry, and/or processing unit may be, or further include, memory and/or an integrated memory element, which may be a single memory device, a plurality of memory devices, and/or embedded circuitry of another processing module, module, processing circuit, processing circuitry, and/or processing unit. Such a memory device may be a read-only memory, random access memory, volatile memory, non-volatile memory, static memory, dynamic memory, flash memory, cache memory, and/or any device that stores digital information. Note that if the processing module, module, processing circuit, processing circuitry, and/or processing unit includes more than one processing device, the processing devices may be centrally located (e.g., directly coupled together via a wired and/or wireless bus structure) or may be distributedly located (e.g., cloud computing via indirect coupling via a local area network and/or a wide area network). Further note that if the processing module, module, processing circuit, processing circuitry and/or processing unit implements one or more of its functions via a state machine, analog circuitry, digital circuitry, and/or logic circuitry, the memory and/or memory element storing the corresponding operational instructions may be embedded within, or external to, the circuitry comprising the state machine, analog circuitry, digital circuitry, and/or logic circuitry. Still further note that, the memory element may store, and the processing module, module, processing circuit, processing circuitry and/or processing unit executes, hard coded and/or operational instructions corresponding to at least some of the steps and/or functions illustrated in one or more of the Figures. Such a memory device or memory element can be included in an article of manufacture.

[0236] One or more embodiments have been described above with the aid of method steps illustrating the performance of specified functions and relationships thereof. The boundaries and sequence of these functional building blocks and method steps have been arbitrarily defined herein for convenience of description. Alternate boundaries and sequences can be defined so long as the specified functions and relationships are appropriately performed. Any such alternate boundaries or sequences are thus within the scope and spirit of the claims. Further, the boundaries of these functional building blocks have been arbitrarily defined for convenience of description. Alternate boundaries could be defined as long as the certain significant functions are appropriately performed. Similarly, flow diagram blocks may also have been arbitrarily defined herein to illustrate certain significant functionality.

[0237] To the extent used, the flow diagram block boundaries and sequence could have been defined otherwise and still perform the certain significant functionality. Such alternate definitions of both functional building blocks and flow diagram blocks and sequences are thus within the scope and

spirit of the claims. One of average skill in the art will also recognize that the functional building blocks, and other illustrative blocks, modules and components herein, can be implemented as illustrated or by discrete components, application specific integrated circuits, processors executing appropriate software and the like or any combination thereof.

[0238] In addition, a flow diagram may include a "start" and/or "continue" indication. The "start" and "continue" indications reflect that the steps presented can optionally be incorporated in or otherwise used in conjunction with one or more other routines. In addition, a flow diagram may include an "end" and/or "continue" indication. The "end" and/or "continue" indications reflect that the steps presented can end as described and shown or optionally be incorporated in or otherwise used in conjunction with one or more other routines. In this context, "start" indicates the beginning of the first step presented and may be preceded by other activities not specifically shown. Further, the "continue" indication reflects that the steps presented may be performed multiple times and/or may be succeeded by other activities not specifically shown. Further, while a flow diagram indicates a particular ordering of steps, other orderings are likewise possible provided that the principles of causality are maintained.

[0239] The one or more embodiments are used herein to illustrate one or more aspects, one or more features, one or more concepts, and/or one or more examples. A physical embodiment of an apparatus, an article of manufacture, a machine, and/or of a process may include one or more of the aspects, features, concepts, examples, etc. described with reference to one or more of the embodiments discussed herein. Further, from figure to figure, the embodiments may incorporate the same or similarly named functions, steps, modules, etc. that may use the same or different reference numbers and, as such, the functions, steps, modules, etc. may be the same or similar functions, steps, modules, etc. or different ones.

[0240] While the transistors in the above described figure (s) is/are shown as field effect transistors (FETs), as one of ordinary skill in the art will appreciate, the transistors may be implemented using any type of transistor structure including, but not limited to, bipolar, metal oxide semiconductor field effect transistors (MOSFET), N-well transistors, P-well transistors, enhancement mode, depletion mode, and zero voltage threshold (VT) transistors.

[0241] Unless specifically stated to the contra, signals to, from, and/or between elements in a figure of any of the figures presented herein may be analog or digital, continuous time or discrete time, and single-ended or differential. For instance, if a signal path is shown as a single-ended path, it also represents a differential signal path. Similarly, if a signal path is shown as a differential path, it also represents a single-ended signal path. While one or more particular architectures are described herein, other architectures can likewise be implemented that use one or more data buses not expressly shown, direct connectivity between elements, and/or indirect coupling between other elements as recognized by one of average skill in the art.

[0242] The term "module" is used in the description of one or more of the embodiments. A module implements one or more functions via a device such as a processor or other processing device or other hardware that may include or operate in association with a memory that stores operational instructions. A module may operate independently and/or in conjunction with software and/or firmware. As also used herein, a module may contain one or more sub-modules, each of which may be one or more modules.

[0243] As may further be used herein, a computer readable memory includes one or more memory elements. A memory element may be a separate memory device, multiple memory devices, or a set of memory locations within a memory device. Such a memory device may be a read-only memory, random access memory, volatile memory, non-volatile memory, static memory, dynamic memory, flash memory, cache memory, and/or any device that stores digital information. The memory device may be in a form a solid-state memory, a hard drive memory, cloud memory, thumb drive, server memory, computing device memory, and/or other physical medium for storing digital information.

[0244] While particular combinations of various functions and features of the one or more embodiments have been expressly described herein, other combinations of these features and functions are likewise possible. The present disclosure is not limited by the particular examples disclosed herein and expressly incorporates these other combinations.

What is claimed is:

1. A cryptocurrency acceptance network computing device of a multi jurisdictional secure and trusted cryptocurrency acceptance system, the cryptocurrency acceptance network computing device comprises:

an interface;

memory; and

a processing module operably coupled to the memory and the interface, wherein the processing module is operable to:

obtain a request to facilitate a cryptocurrency-based payment between a payor computing device of a plurality of payor computing devices of the multi jurisdictional secure and trusted cryptocurrency acceptance system and a payee computing device of a plurality of payee computing devices of the multi jurisdictional secure and trusted cryptocurrency acceptance system, wherein the payor computing device uses a first cryptocurrency recognized by a first cryptocurrency exchange computing device of a worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the payor computing device, wherein the payee computing device accepts a desired currency recognized by a second cryptocurrency exchange computing device of the worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the payee computing device;

place a hold on an amount of collateral cryptocurrency based on the cryptocurrency-based payment;

determine whether the first cryptocurrency exchange computing device recognizes the desired currency and whether the second cryptocurrency exchange computing device recognizes the first cryptocurrency;

when the first cryptocurrency exchange computing device does not recognize the desired currency or the second cryptocurrency exchange computing device does not recognize the first cryptocurrency:

connect to the first cryptocurrency exchange computing device to exchange an amount of the first cryptocurrency to a substantially equivalent amount of a universally accepted cryptocurrency;

connect to the second cryptocurrency exchange computing device to exchange the substantially equivalent amount of the universally accepted cryptocurrency to a substantially equivalent amount of the desired currency; and

send the substantially equivalent amount of the desired currency to the payor computing device to complete the cryptocurrency-based payment.

2. The cryptocurrency acceptance network computing device of claim **1**, wherein the processing module is further operable to:

when the second cryptocurrency exchange computing device recognizes the first cryptocurrency and the cryptocurrency-based payment occurs in the jurisdictional location of the payee computing device:

connect to the second cryptocurrency exchange computing device to exchange the amount of the first cryptocurrency to the substantially equivalent amount of the desired currency; and

when the first cryptocurrency exchange computing device recognizes the desired currency and the cryptocurrency-based payment occurs in the jurisdictional location of the payor computing device:

connect to the first cryptocurrency exchange computing device to exchange the amount of the first cryptocurrency to the substantially equivalent amount of the desired currency.

3. The cryptocurrency acceptance network computing device of claim **1** further comprises:

a stake pool, wherein one or more of the payor and payee computing devices are associated with a stake account of a plurality of stake accounts of the stake pool, and wherein one or more staking entities store collateral cryptocurrency in the stake account for purposes of backing cryptocurrency-based payments of the one or more of the payor and payee computing devices.

4. The cryptocurrency acceptance network computing device of claim **1**, wherein the processing module is further operable to:

connect to a consensus network associated with the first cryptocurrency;

seek a desired number of confirmations of the amount of the first cryptocurrency; and

when the desired number of confirmations of the amount of the first cryptocurrency is completed by the consensus network:

release the hold on the amount of the collateral cryptocurrency.

5. The cryptocurrency acceptance network computing device of claim **4**, wherein the processing module is further operable to:

when the desired number of confirmations of the amount of the first cryptocurrency is not completed by the consensus network:

consume the amount of the collateral cryptocurrency to cover the cryptocurrency-based payment.

6. The cryptocurrency acceptance network computing device of claim **1**, wherein the desired currency includes one of:

fiat currency; and

a cryptocurrency recognized by the second cryptocurrency exchange computing device.

7. The cryptocurrency acceptance network computing device of claim **1**, wherein the processing module is further operable to:

obtain a second request to facilitate a second cryptocurrency-based payment between the payor computing device and a second payee computing device, and wherein the second payee computing device accepts a second desired currency recognized by a third cryptocurrency exchange computing device of the worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the second payee computing device;

place a hold on an amount of collateral cryptocurrency based on the second cryptocurrency-based payment;

determine whether the first cryptocurrency exchange computing device recognizes the second desired currency and whether the third cryptocurrency exchange computing device recognizes the first cryptocurrency;

when the first cryptocurrency exchange computing device does not recognize the second desired currency or the second cryptocurrency exchange computing device does not recognize the first cryptocurrency:

connect to the first cryptocurrency exchange computing device to exchange an amount of the first cryptocurrency to a substantially equivalent amount of the universally accepted cryptocurrency;

connect to the third cryptocurrency exchange computing device to exchange the substantially equivalent amount of the universally accepted cryptocurrency to a substantially equivalent amount of the second desired currency; and

send the substantially equivalent amount of the second desired currency to the second payor computing device to complete the cryptocurrency-based payment.

8. The cryptocurrency acceptance network computing device of claim **1**, wherein the universally accepted cryptocurrency is recognized by the worldwide network of cryptocurrency exchange computing devices.

9. The cryptocurrency acceptance network computing device of claim **1**, wherein the processing module is operable to send the substantially equivalent amount of the desired currency to the payor computing device to complete the cryptocurrency-based payment by one of:

instructing the second cryptocurrency exchange computing device to send the substantially equivalent amount of the desired currency to the payor computing device;

instructing the second cryptocurrency exchange computing device to send the substantially equivalent amount of the desired currency to a banking computing device associated with the payor computing device;

obtaining the substantially equivalent amount of the desired currency from the second cryptocurrency exchange computing device and sending the substantially equivalent amount of the desired currency to the payor computing device; and

obtaining the substantially equivalent amount of the desired currency from the second cryptocurrency exchange computing device and sending the substan-

tially equivalent amount of the desired currency to the banking computing device associated with the payor computing device.

10. A method comprises:

obtaining, by a cryptocurrency acceptance network computing device of a multi jurisdictional secure and trusted cryptocurrency acceptance system, a request to facilitate a cryptocurrency-based payment between a payor computing device of a plurality of payor computing devices of the multi-jurisdictional secure and trusted cryptocurrency acceptance system and a payee computing device of a plurality of payee computing devices of the multi jurisdictional secure and trusted cryptocurrency acceptance system, wherein the payor computing device uses a first cryptocurrency recognized by a first cryptocurrency exchange computing device of a worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the payor computing device, and wherein the payee computing device accepts a desired currency recognized by a second cryptocurrency exchange computing device of the worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the payee computing device;

placing, by the cryptocurrency acceptance network computing device, a hold on an amount of collateral cryptocurrency based on the cryptocurrency-based payment;

determining, by the cryptocurrency acceptance network computing device, whether the first cryptocurrency exchange computing device recognizes the desired currency and whether the second cryptocurrency exchange computing device recognizes the first cryptocurrency;

when the first cryptocurrency exchange computing device does not recognize the desired currency or the second cryptocurrency exchange computing device does not recognize the first cryptocurrency:

connecting, by the cryptocurrency acceptance network computing device, to the first cryptocurrency exchange computing device to exchange an amount of the first cryptocurrency to a substantially equivalent amount of a universally accepted cryptocurrency;

connecting, by the cryptocurrency acceptance network computing device, to the second cryptocurrency exchange computing device to exchange the substantially equivalent amount of the universally accepted cryptocurrency to a substantially equivalent amount of the desired currency; and

sending, by the cryptocurrency acceptance network computing device, the substantially equivalent amount of the desired currency to the payor computing device to complete the cryptocurrency-based payment.

11. The method of claim **10** further comprises:

when the second cryptocurrency exchange computing device recognizes the first cryptocurrency and the cryptocurrency-based payment occurs in the jurisdictional location of the payee computing device:

connecting, by the cryptocurrency acceptance network computing device, to the second cryptocurrency exchange computing device to exchange the amount of the first cryptocurrency to the substantially equivalent amount of the desired currency; and

when the first cryptocurrency exchange computing device recognizes the desired currency and the cryptocurrency-based payment occurs in the jurisdictional location of the payor computing device:

connecting, by the cryptocurrency acceptance network computing device, to the first cryptocurrency exchange computing device to exchange the amount of the first cryptocurrency to the substantially equivalent amount of the desired currency.

12. The method of claim **10**, wherein one or more of the payor and payee computing devices are associated with a stake account of a plurality of stake accounts of a stake pool of the cryptocurrency acceptance network computing device, and wherein one or more staking entities store collateral cryptocurrency in the stake account for purposes of backing cryptocurrency-based payments of the one or more of the payor and payee computing devices.

13. The method of claim **10**, wherein facilitating the cryptocurrency-based payment further comprises:

connecting, by the cryptocurrency acceptance network computing device, to a consensus network associated with the first cryptocurrency;

seeking, by the cryptocurrency acceptance network computing device, a desired number of confirmations of the amount of the first cryptocurrency; and

when the desired number of confirmations of the amount of the first cryptocurrency is completed by the consensus network:

releasing, by the cryptocurrency acceptance network computing device, the hold on the amount of the collateral cryptocurrency.

14. The method of claim **13** further comprises:

when the desired number of confirmations of the amount of the first cryptocurrency is not completed by the consensus network:

withdrawing, by the cryptocurrency acceptance network computing device, the amount of the collateral cryptocurrency to cover the cryptocurrency-based payment.

15. The method of claim **10**, wherein the desired currency includes one of:

fiat currency; and

a cryptocurrency recognized by the second cryptocurrency exchange computing device.

16. The method of claim **10** further comprises:

obtaining, by the cryptocurrency acceptance network computing device, a second request to facilitate a second cryptocurrency-based payment between the payor computing device and a second payee computing device, and wherein the second payee computing device accepts a second desired currency recognized by a third cryptocurrency exchange computing device of the worldwide network of cryptocurrency exchange computing devices associated with a jurisdictional location of the second payee computing device;

placing, by the cryptocurrency acceptance network computing device, a hold on an amount of collateral cryptocurrency based on the second cryptocurrency-based payment;

determining, by the cryptocurrency acceptance network computing device, whether the first cryptocurrency exchange computing device recognizes the second

desired currency and whether the third cryptocurrency exchange computing device recognizes the first cryptocurrency;

when the first cryptocurrency exchange computing device does not recognize the second desired currency or the third cryptocurrency exchange computing device does not recognize the first cryptocurrency:

connecting, by the cryptocurrency acceptance network computing device, to the first cryptocurrency exchange computing device to exchange a second amount of the first cryptocurrency to a second substantially equivalent amount of the universally accepted cryptocurrency;

connecting, by the cryptocurrency acceptance network computing device, to the third cryptocurrency exchange computing device to exchange the second substantially equivalent amount of the universally accepted cryptocurrency to a substantially equivalent amount of the second desired currency; and

sending, by the cryptocurrency acceptance network computing device, the substantially equivalent amount of the second desired currency to the second payor computing device to complete the cryptocurrency-based payment.

17. The method of claim **10**, wherein the universally accepted cryptocurrency is recognized by the worldwide network of cryptocurrency exchange computing devices.

18. The method of claim **10**, wherein the sending the substantially equivalent amount desired currency to the payor computing device to complete the cryptocurrency-based payment includes one of:

instructing, by the cryptocurrency acceptance network computing device, the second cryptocurrency exchange computing device to send the substantially equivalent amount of the desired currency to the payor computing device;

instructing, by the cryptocurrency acceptance network computing device, the second cryptocurrency exchange computing device to send the substantially equivalent amount of the desired currency to a banking computing device associated with the payor computing device;

obtaining, by the cryptocurrency acceptance network computing device, the substantially equivalent amount of the desired currency from the second cryptocurrency exchange computing device and sending the substantially equivalent amount of the desired currency to the payor computing device; and

obtaining, by the cryptocurrency acceptance network computing device, the substantially equivalent amount of the desired currency from the second cryptocurrency exchange computing device and sending the substantially equivalent amount of the desired currency to the banking computing device associated with the payor computing device.

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