

COMPUTER METHOD AND APPARATUS FOR ADMINISTERING A COMMODITY MATERIAL TRANSACTION VIA A DISTRIBUTED LEDGER

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CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims priority benefit from U.S. Provisional Patent
10 Application No. 62/714,456, entitled "COMPUTER METHOD AND APPARATUS
FOR ADMINISTERING A COMMODITY MATERIAL TRANSACTION VIA A
DISTRIBUTED LEDGER," filed August 3, 2018 (docket number 3058-001-02).
The present application also claims priority benefit from U.S. Provisional Patent
Application No. 62/714,324, entitled "METHOD AND APPARATUS FOR
15 CONVEYING VALUE ASSOCIATED WITH A COMMODITY," filed August 3,
2018 (docket number 3058-002-02). Each of the foregoing applications, to the
extent not inconsistent with the disclosure herein, is incorporated by reference.

The present application is related to co-pending International PCT
Application No. [TBD], entitled, "METHOD AND APPARATUS FOR
20 TOKENIZATION OF A NATURAL RESOURCE," (docket number 3058-011-04),
filed on the same date as the present application. Co-pending International PCT
Application No. [TBD], to the extent not inconsistent with the disclosure herein, is
incorporated by reference.

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SUMMARY

According to an embodiment, a computer method for administering a
commodity material transaction includes receiving, via a first graphical user

interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency, and receiving, via a second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency. The computer method includes determining that the ask price and the bid price meet a match criterion. The computer method includes receiving a first digital currency, cryptocurrency, or digital security transaction corresponding to the bid price from a buyer wallet into a transaction wallet, and transmitting a second digital currency, cryptocurrency, or digital security transaction corresponding to the ask price from the transaction wallet to a seller wallet. The computer method includes issuing a distributed ledger token corresponding to the quantity of the commodity material, and transmitting the distributed ledger token to the buyer wallet.

According to an embodiment, a non-transitory computer-readable medium carries computer instructions to cause a computer to execute a method including receiving, via a first graphical user interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency, and receiving, via a second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency. The non-transitory computer-readable medium includes determining that the ask price and the bid price meet a match criterion. The non-transitory computer-readable medium includes receiving a first cryptocurrency, digital security financial instrument, and/or digital bearer asset transaction corresponding to the bid price from a buyer wallet into a transaction wallet, and transmitting a second digital financial instrument, or digital bearer asset, cryptocurrency, and/or digital security transaction corresponding to the ask price from the transaction wallet to a seller wallet. The non-transitory computer-readable medium includes issuing a distributed ledger token corresponding to the quantity of the commodity material, and transmitting the distributed ledger token to the buyer wallet.

According to an embodiment, a computer system includes a webserver configured to output a first graphical user interface (GUI) to a first device for a seller and to receive an ask price for a quantity of a commodity material. The

webserver is further configured to output a second GUI to a second device for a buyer and to receive a bid price for the quantity of the commodity material. The computer system includes a server computer, operatively coupled to the webserver, and configured to determine that the ask price and the bid price meet
5 a match criterion, to authorize first and second cryptocurrency and/or digitally securitized asset transactions to respectively transfer the ask price to the seller and receive the bid price from the buyer, and to transmit said authorizations to the webserver.

According to an embodiment, a computer method for conveying value
10 associated with a commodity includes issuing, with a server computer, a distributed ledger token corresponding to a distinguishable instance of a commodity, and outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity. The distributed
15 ledger token represents ownership of the distinguishable instance of the commodity.

According to an embodiment, a non-transitory computer readable medium carrying computer instructions capable of causing a computer to execute a method including issuing, with a server computer, a distributed ledger token
20 corresponding to a distinguishable instance of a commodity, and outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity. The distributed ledger token represents ownership of the distinguishable instance of the commodity.

According to an embodiment, a computer system for conveying value
25 associated with a commodity includes a web server operatively coupled to a first user device via the Internet. The web server is configured to receive commodity availability data from the first user device. The computer system includes at least one server computer operatively coupled to the web server. The server
30 computer is configured to receive the commodity availability data from the web server and issue a distributed ledger token corresponding to a distinguishable

instance of the available commodity. The server computer is further configured to credit the distributed ledger token to the first user in return for a smart contract that causes ownership of the distributed ledger token to legally represent ownership of the commodity distinguishable instance. The server computer is
5 further configured to cooperate with the web server to transmit information related to the distributed ledger token and the commodity distinguishable instance represented thereby, via the Internet, for display in a graphical user interface (GUI) on the user device.

According to an embodiment, a computer method for transferring an
10 interest in a commodity includes receiving, into a server computer from a first user via a graphical user interface (GUI) displayed on a remote user device and a network, a private key and an image of a proof of ownership of a distinguishable instance of a commodity. The computer method includes generating a smart contract conveying conditional ownership of the
15 distinguishable instance of the commodity. The computer method includes issuing, with the server computer, a first quantity of electronic tokens on a distributed ledger, the first quantity of electronic tokens carrying the smart contract such that the first quantity of electronic tokens are capable of collectively representing ownership of the distinguishable instance of the commodity. The
20 computer method includes transferring at least a portion of the first quantity of electronic tokens to a first user electronic wallet corresponding to the first user, and receiving, from the first user via a remote device, an offer to sell at least a portion of the first quantity of electronic tokens. The computer method includes listing at least a portion of the first quantity of electronic tokens on an electronic
25 token exchange, and transferring at least a portion of the first quantity of electronic tokens from the first user electronic wallet to a buyer wallet using an exchange settlement service disposed on a second server computer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a flowchart showing a computer method for administering a commodity material transaction, according to an embodiment.

5 **FIG. 2** is a block diagram of a computer system configured to administer a commodity material transaction, according to an embodiment.

FIG. 3 is a flowchart illustrating a computer method for conveying value associated with a commodity, according to an embodiment.

10 **FIG. 4** is a flowchart illustrating a process of the method shown in **FIG. 3**, according to an embodiment.

FIG. 5 is a diagram of a computer system for conveying value associated with a commodity, according to an embodiment.

FIG. 6 is a flowchart showing a computer method for transferring an interest in a commodity, according to an embodiment.

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DETAILED DESCRIPTION

20 In the following detailed description, reference is made to the accompanying drawings, which form a part hereof. In the drawings, similar symbols typically identify similar components, unless context dictates otherwise. Other embodiments may be used and/or other changes may be made without departing from the spirit or scope of the disclosure.

25 **FIG. 1** is a flowchart showing a computer method 100 for administering a commodity material transaction, according to an embodiment. The computer method 100 may include several steps.

30 According to an embodiment, step 102 may include receiving, via a first graphical user interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency.

According to an embodiment, step 104 may include receiving, via a second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency.

5 According to an embodiment, step 106 may include determining that the ask price and the bid price meet a match criterion.

According to an embodiment, step 108 may include receiving a first digital bearer asset, cryptocurrency and/or digital security transaction corresponding to the bid price from a buyer wallet into a transaction wallet.

10 According to an embodiment, step 110 may include transmitting a second digital bearer asset, cryptocurrency, and/or digital security transaction corresponding to the ask price from the transaction wallet to a seller wallet.

According to an embodiment, step 112 may include issuing a distributed ledger token corresponding to the quantity of the commodity material.

15 According to an embodiment, step 114 may include transmitting the distributed ledger token to the buyer wallet.

According to an embodiment, with reference to step 104, the first currency may include a fiat currency such as United States dollars. Additionally or alternatively, the first currency may include a cryptocurrency, digital security, and/or digital bearer asset. According to an embodiment, the second currency
20 may include a different currency than the first currency. According to an embodiment, the second currency may include the same currency as the first currency.

According to an embodiment, the first GUI in step 102 and the second GUI in step 104 may include respective instances of the same GUI.

25 According to an embodiment, referring to **FIG. 1**, step 101 may include displaying, via the GUI to at least one of the seller or the buyer, at least one benchmark price for the quantity of the commodity material. Additionally or alternatively, step 101 may include displaying, via the GUI to at least one of the seller or the buyer, at least one estimated price for the quantity of the commodity
30 material. In another embodiment, step 101 may include displaying, via the GUI

to at least one of the seller or the buyer, at least one historical price for the quantity of the commodity material.

According to an embodiment, with reference to step 106, determining that the ask price and the bid price meet a match criterion may include determining
5 that the bid price is greater than or equal to the ask price plus a transaction fee.

According to an embodiment, with reference to step 108, receiving the first cryptocurrency, digital security, and/or digital bearer asset transaction from the buyer wallet into the transaction wallet may include receiving a fungible
10 cryptocurrency and/or digitally securitized asset. Additionally or alternatively, with reference to step 108, receiving the first cryptocurrency and/or digitally securitized asset transaction may include receiving a distributed ledger token corresponding to a quantity of a second commodity material different than the commodity material.

According to an embodiment, step 101 may include displaying a property
15 of the commodity material in the GUI. In embodiments, the property may include a commodity grade, a physical property, an extrinsic property, an elemental analysis, and/or other properties that may affect a value of the commodity material. Additionally or alternatively, step 101 may include displaying price information about the commodity quantity in the GUI. According to an
20 embodiment, with reference to step 101, displaying the price information may include displaying a price history for previous quantities of the commodity material. Additionally or alternatively, with reference to step 101, displaying the price information may include displaying a modeled price for the commodity material.

25 According to an embodiment, with reference to step 102, the quantity of commodity material may include a particular distinguishable instance of the commodity material and/or may include a generalized portion of the commodity.

According to an embodiment, the commodity material may include in-situ minerals, metals, and hydrocarbon deposits. According to an embodiment, the
30 quantity may include a ton or a metric tonne. According to an embodiment, the quantity may include a quantity of refined metal produced from the in-ground ore.

According to an embodiment, the commodity material may be produced (e.g., mined, harvested, butchered, refined, etc.) at a future date. According to an embodiment, the commodity material may exist in a transportable form at the moment of distributed ledger token issuance.

5 According to an embodiment, the commodity material may include mined ore or coal. Additionally or alternatively, the commodity material may include hydrocarbon deposits including oil and/or natural gas. In an alternative embodiment, the commodity material may include liquefied natural gas.

10 According to an embodiment, the quantity may include a number of standard cubic feet. Additionally or alternatively, the quantity may include a unit of mass. In an alternative embodiment, the quantity may include a unit of energy.

15 According to an embodiment, the commodity material may include a (e.g., an in-ground) portion of a natural gas deposit. Additionally or alternatively, the commodity material may include an agricultural product.

20 According to an embodiment, step 112 may include receiving a second ask price for the distributed ledger token at a later date. The distributed ledger token may represent the same distinguishable instance of the commodity material as when the distributed ledger token was issued, according to an embodiment.

 According to an embodiment, the method 100 may include receiving notice that the distinguishable instance of the commodity material is delivered, receiving payment for the delivered commodity material, and redeeming the distributed ledger token for a currency corresponding to the received payment.

25 According to an embodiment, the distributed ledger token may be burned when redeemed. "Burning" the distributed ledger token refers to rendering the token permanently non-tradable. According to an embodiment, the value of the distributed ledger token may be reset to zero when redeemed. Additionally or alternatively, the value of the distributed ledger token may be set to equal the
30 current value of the quantity of the commodity material. According to an

embodiment, the distributed ledger token may be asset-backed by the distinguishable instance of commodity material it is issued to represent.

According to an embodiment, a non-transitory computer-readable medium carries computer instructions to cause a computer to execute a method 100. The
5 method 100 may include several steps.

According to an embodiment, step 102 may include receiving, via a first graphical user interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency.

According to an embodiment, step 104 may include receiving, via a
10 second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency.

According to an embodiment, step 106 may include determining that the ask price and the bid price meet a match criterion.

According to an embodiment, step 108 may include receiving a first digital
15 asset, cryptocurrency, digital security, and/or digitally securitized asset transaction corresponding to the bid price from a buyer wallet into a transaction wallet.

According to an embodiment, step 110 may include transmitting a second digital asset, cryptocurrency, digital security, and/or digitally securitized asset
20 transaction corresponding to the ask price from the transaction wallet to a seller wallet.

According to an embodiment, step 112 may include issuing a distributed ledger token corresponding to the quantity of the commodity material.

According to an embodiment, step 114 may include transmitting the
25 distributed ledger token to the buyer wallet.

FIG. 2 is a block diagram of a computer system 200 configured to administer a commodity material transaction, according to an embodiment.

According to an embodiment, the computer system 200 may include a webserver 202 configured to output a first graphical user interface (GUI) to a first
30 device 204 for a seller and to receive an ask price for a quantity of a commodity material. The webserver 202 may be further configured to output a second GUI

to a second device 206 for a buyer and to receive a bid price for the quantity of the commodity material, according to an embodiment. The computer system 200 may include a server computer 208, operatively coupled to the webserver 202, and configured to determine that the ask price and the bid price meet a match
5 criterion, to authorize first and second transactions to respectively transfer the ask price to the seller and receive the bid price from the buyer, and transmit said authorizations to the webserver 202.

According to an embodiment, the computer system 200 may include a plurality of devices 210 operatively coupled to the webserver 202 and carrying
10 the distributed ledger. The webserver 202 may be configured to transmit the authorized first and second transactions to the plurality of devices 210, according to an embodiment. The plurality of devices 210 may be configured to collectively validate the first and second transactions, according to an embodiment. The webserver 202 may be configured to receive and forward collective validation to
15 the server computer 208, according to an embodiment.

According to an embodiment, the server computer 208 may be further configured to receive a first cryptocurrency and/or digital security transaction corresponding to the bid price from a buyer wallet 212 to a transaction wallet 214 via the webserver 202. The server computer 208 may transmit a second
20 cryptocurrency and/or digital security transaction corresponding to the ask price from the transaction wallet 214 to a seller wallet 216 via the webserver 202, according to an embodiment. The server computer 208 may issue a distributed ledger token corresponding to the quantity of the commodity material, according to an embodiment. The server computer 208 may cause the webserver 202 to
25 transmit the token to the buyer wallet 212.

FIG. 3 is a flowchart illustrating a computer method 300 for conveying value associated with a commodity, according to an embodiment. The computer method 300 may include several steps.

According to an embodiment, step 304 may include issuing, with a server
30 computer, a distributed ledger token corresponding to a distinguishable instance of a commodity.

According to an embodiment, step 310 may include outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity.

5 According to an embodiment, with reference to step 304, the distributed ledger token represents ownership of the distinguishable instance of the commodity.

According to various embodiments, the distinguishable instances of the commodity may have 1:1 relationships to respective distributed ledger tokens.

10 For example, the nth distinguishable instance transferred during receipt for shipment, an intermodal transfer, or delivery, etc., may correspond specifically to the nth token. In this way, in the case of distinguishable instances being defined according to sequence, lower sequenced tokens have a higher probability of delivery in a lossy transport system.

15 In another embodiment, the distributed ledger tokens and respective distinguishable instances may have a many-to-many relationship, within a commodity distinguishable instances set (e.g., within a particular day of issuance, production, or shipment). In this way, all distributed ledger tokens in an issued set have an equal probability of delivery in a lossy transport system.

20 The relationship of distinguishable instances to distributed ledger tokens in a given issuance may optionally be selectable as a parameter by the seller or the token issuer.

According to an embodiment, referring to **FIG. 3**, step 302 may include receiving, via the web server, availability data from a seller device indicating
25 availability of the distinguishable instance of the commodity. According to an embodiment, with reference to step 302, the availability data may be indicative of current availability of the distinguishable instance of the commodity. Additionally or alternatively, the availability data may be indicative of a planned availability of the commodity. According to an embodiment, receiving the availability data, in
30 step 302, may include receiving the data as an encrypted transaction on the distributed ledger.

According to an embodiment, with reference to step 304, issuing the distributed ledger token may include issuing a public blockchain token. Additionally or alternatively, issuing the distributed ledger token may include issuing a permissioned blockchain token. In another embodiment, issuing the distributed ledger token may include issuing a private blockchain token.

According to an embodiment, with reference to step 304, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include parsing property data related to one or more physical properties of the distinguishable instance of the commodity, hashing the property data, and adding the property data onto the distributed ledger as a transaction. In another embodiment, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include, in step 304, receiving property data from a seller device, the data corresponding to the one or more physical properties.

According to an embodiment, with reference to step 304, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include parsing property data related to a mass or volume of the distinguishable instance of the commodity, hashing the property data, and adding the property data onto the distributed ledger as a transaction. In another embodiment, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include, in step 304, receiving property data from a seller device, the data corresponding to the one or more physical properties.

According to an embodiment, with reference to step 304, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include parsing availability data related to a projected date or time of availability of the distinguishable instance of the commodity, hashing the availability data, and adding the availability data onto the distributed ledger as a transaction. In another embodiment, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include, in

step 304, receiving availability data from a seller device, the data corresponding to the one or more physical properties.

According to an embodiment, with reference to step 304, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include parsing availability data related to a location of the distinguishable instance of the commodity, hashing the availability data, and adding the availability data onto the distributed ledger as a transaction. In another embodiment, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include, in step 304, receiving availability data from a seller device, the data corresponding to the one or more physical properties.

According to an embodiment, with reference to step 304, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include parsing availability data related to a position of the distinguishable instance of the commodity in a sequence of distinguishable instances of the commodity, hashing the availability data, and adding the availability data onto the distributed ledger as a transaction. In another embodiment, issuing the distributed ledger token corresponding to the distinguishable instance of the commodity may include, in step 304, receiving availability data from a seller device, the data corresponding to the one or more physical properties.

According to an embodiment, referring to **FIG. 3**, step 306 may include receiving, via the web server, certification data corresponding to a certification of one or more parameters corresponding to the distinguishable instance of the commodity. According to an embodiment, receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity may include receiving certification data from the seller, as in a self-certification. Additionally or alternatively, receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity may include receiving data from a third party, as in a registered certification agent. In another

embodiment, receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity may include receiving data from an automated measurement device, as in machine certification.

5 According to an embodiment, step 308 may include adding the certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity onto the distributed ledger token. According to an embodiment, with reference to step 308, the certification data may be added onto the distributed ledger token as
10 metadata. Additionally or alternatively, the certification data may be added onto the distributed ledger token as an encrypted transaction. In an embodiment, the certification data may be added onto the distributed ledger token at the moment of issuance. Additionally or alternatively, the certification data may be added onto the distributed ledger token after issuance of the distributed ledger token.

15 According to an embodiment, referring to **FIG. 3**, the computer method 300 may include establishing at least a first value occurs after adding the certification data onto the distributed ledger token.

FIG. 4 is a flowchart illustrating a process 312 of the computer method 300 shown in **FIG. 3**, according to an embodiment. The process 312 may
20 include several steps.

 According to an embodiment, the process 312 may include transferring ownership of the distributed ledger token from a seller to a buyer. According to an embodiment, transferring ownership of the distributed ledger token may also transfer ownership of the distinguishable instance of the commodity
25 corresponding to the distributed ledger token.

 According to an embodiment, with reference to the process 312 in **FIG. 4**, transferring ownership of the distributed ledger token may include, in step 402, establishing, using at least the server computer, a selling valuation and a corresponding buying valuation for the distributed ledger token. For example,
30 step 402 may include receiving a selling price from the seller. Alternatively, establishing the selling valuation may include calculating the selling valuation

from an offered buying price. In embodiments, a difference between buying and selling valuations corresponds to an exchange fee for a transaction.

According to an embodiment, step 406 may include receiving, via the web server, an acceptance of at least one of the selling valuation or the buying valuation, and, in step 412, receiving, via the web server, a cryptocurrency, second distributed ledger token, or cryptocurrency and second distributed ledger token transaction equal to the buying valuation from at least one buyer resource. According to an embodiment, transferring ownership of the distributed ledger token may include, in step 416, transmitting, via the web server, the distributed ledger token to the at least one buyer resource, and, in step 418, transmitting, via the web server, a cryptocurrency, second distributed ledger token, or cryptocurrency and second distributed ledger token transaction equal to the selling valuation to at least one seller resource.

According to an embodiment, a non-transitory computer readable medium carrying computer instructions capable of causing a computer to execute a method may include the computer method 300 for conveying value associated with a commodity. The computer method 300 may include several steps.

According to an embodiment, step 304 may include issuing, with a server computer, a distributed ledger token corresponding to a distinguishable instance of a commodity.

According to an embodiment, step 310 may include outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity.

According to an embodiment, with reference to step 304, the distributed ledger token represents ownership of the distinguishable instance of the commodity.

FIG. 5 is a diagram of a computer system 500 for conveying value associated with a commodity, according to a embodiment.

According to an embodiment, the computer system 500 may include a web server 502 operatively coupled to a seller device 504 via the Internet 506.

The web server 502 may be configured to receive commodity availability data from the seller device 504, according to an embodiment. The computer system 500 may include at least one server computer 508 operatively coupled to the web server 502, according to an embodiment. The server computer 508 may be
5 configured to receive the commodity availability data from the web server 502, and to issue a distributed ledger token corresponding to a distinguishable instance of the available commodity, according to an embodiment. The server computer 508 may be further configured to credit the distributed ledger token to the seller device 504 in return for a smart contract that causes ownership of the
10 distributed ledger token to legally represent ownership of the commodity distinguishable instance, according to an embodiment. The server computer 508 may be further configured to cooperate with the web server 502 to transmit at least information related to the distributed ledger token and the commodity distinguishable instance represented thereby, via the Internet 506, for display in a
15 graphical user interface (GUI) or the seller device 504, according to an embodiment.

According to an embodiment, in the computer system 500, the server computer 508 may be configured to cooperate with the web server 502 to receive property data related to the commodity distinguishable instance from the seller
20 device 504, and to publish the property data or pointer thereto onto the distributed ledger token. Additionally or alternatively, the server computer 508 may be configured to cooperate with the web server 502 to receive property data related to the commodity distinguishable instance from a certification agent device 510, and to publish the property data or a pointer to the property data onto
25 the distributed ledger token. In another embodiment, the server computer 508 may be configured to cooperate with the web server 502 to receive location, production, or movement data related to the distinguishable instance of the commodity from a production, transportation, or storage service device 512, and to publish the data or a pointer to the data onto the distributed ledger token.
30 Additionally or alternatively, the server computer 508 may be configured to cooperate with the web server 502 to receive location, production, property, or

proof of existence or delivery data from an automated device 514, and to publish the data or a pointer to the data onto the distributed ledger token.

According to an embodiment, the computer method 500 may include a plurality of stakeholder devices 516 operatively coupled to the server computer 508, each stakeholder device 516 holding at least a portion of the distributed ledger. Issuing the distributed ledger token may include transmitting data to at least a portion of the stakeholder devices 516, according to an embodiment.

According to an embodiment, the plurality of stakeholder devices 516 may include the seller device 504 and at least one buyer device 518.

According to an embodiment, the server computer 508 may operate as an oracle configured to add real-world data to the distributed ledger.

According to an embodiment, the computer method 500 may include the buyer device 518 operatively coupled to the web server 502 and the server computer 508. The server computer 508 and the plurality of stakeholder devices 516 may be configured to facilitate a swap of the distributed ledger token from a seller resource 520 (e.g., wallet) to a buyer resource 522 (e.g., wallet).

FIG. 6 is a flowchart showing a computer method 600 for transferring an interest in a commodity, according to an embodiment.

According to an embodiment, the computer method 600 for transferring an interest in a commodity includes, in step 602, receiving, into a server computer from a first user via a graphical user interface (GUI) displayed on a remote user device and a network, a private key and an image of a proof of ownership of a distinguishable instance of a commodity. The computer method 600 includes, in step 604, generating a smart contract conveying conditional ownership of the distinguishable instance of the commodity. The computer method 600 includes, in step 606, issuing, with the server computer, a first quantity of electronic tokens on a distributed ledger, the first quantity of electronic tokens carrying the smart contract such that the first quantity of electronic tokens are capable of collectively representing ownership of the distinguishable instance of the commodity. The computer method 600 includes, in step 608, transferring at least a portion of the first quantity of electronic tokens to a first user electronic wallet corresponding to

the first user. The computer method 600 includes, in step 610, receiving, from the first user via the GUI displayed on the remote user device, an offer to sell at least a portion of the first quantity of electronic tokens. The computer method 600 includes, in step 612, listing at least a portion of the first quantity of electronic
5 tokens on an electronic token exchange. The computer method 600 includes, in step 614, transferring at least a portion of the first quantity of electronic tokens from the first user electronic wallet to a buyer wallet using an exchange settlement service disposed on a second server computer.

According to an embodiment, the computer method 600 for transferring an
10 interest in a commodity further includes encrypting and storing the proof of ownership at a secret location, and hashing data corresponding to the secret location onto the first quantity of electronic tokens using a distributed ledger transaction. The secret location may include a networked storage address. The networked storage address may be made secret by encrypting the networked
15 storage address before hashing the encrypted storage onto the first quantity of electronic tokens on the distributed ledger.

According to an embodiment, the smart contract condition is satisfied by binding transfer of the distinguishable instance of the commodity to the first quantity of electronic tokens and transfer of at least a portion of the first quantity
20 of electronic tokens to the first user electronic wallet. In an embodiment, the binding transfer of the distinguishable instance of the commodity includes signing the smart contract using the private key.

According to an embodiment, the computer method 600 for transferring an interest in a commodity further includes transmitting a public key to the electronic
25 token exchange. The public key may be configured to enable a buyer to view the proof of ownership without knowing the secret location.

According to an embodiment, in step 610, receiving, from the first user via a remote device, an offer to sell at least a portion of the first quantity of electronic tokens includes establishing an ask price for an electronic token. In one
30 embodiment, establishing an ask price for the electronic token includes receiving

an ask price from the first user via the GUI on the remote user device and the network.

According to an embodiment, in step 612, listing at least a portion of the first quantity of electronic tokens on an electronic token exchange and, in step 5 614, transferring at least a portion of the first quantity of electronic tokens from the first user wallet to a buyer wallet using an exchange settlement service disposed on a second server computer includes: receiving a bid price from a buyer via a buyer device and the network, determining that the ask price and the bid price meet a match criterion, transferring the electronic token to a second 10 user wallet corresponding to the second user, and transferring a settlement price to the first user wallet. In one embodiment, the settlement price is denominated in an electronic currency.

While various aspects and embodiments have been disclosed herein, 15 other aspects and embodiments are contemplated. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

CLAIMS

What is claimed is:

1. A computer method for administering a commodity material transaction, comprising:
 - receiving, via a first graphical user interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency;
 - receiving, via a second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency;
 - determining that the ask price and the bid price meet a match criterion;
 - receiving a first cryptocurrency transaction corresponding to the bid price from a buyer wallet into a transaction wallet;
 - transmitting a second cryptocurrency transaction corresponding to the ask price from the transaction wallet to a seller wallet;
 - issuing a distributed ledger token corresponding to the quantity of the commodity material; and
 - transmitting the distributed ledger token to the buyer wallet.
2. The computer method of claim 1, wherein the first currency comprises United States dollars.
3. The computer method of claim 1, wherein the first currency comprises a cryptocurrency.
4. The computer method of claim 1, wherein the second currency comprises a different currency than the first currency.
5. The computer method of claim 1, wherein the second currency comprises the same currency as the first currency.

6. The computer method of claim 1, wherein the first GUI and the second GUI comprise respective instances of the same GUI.
7. The computer method of claim 1, further comprising:
displaying, via the GUI to at least one of the seller or the buyer, at least one benchmark price for the quantity of the commodity material.
8. The computer method of claim 1, further comprising:
displaying, via the GUI to at least one of the seller or the buyer, at least one estimated price for the quantity of the commodity material.
9. The computer method of claim 1, further comprising:
displaying, via the GUI to at least one of the seller or the buyer, at least one historical price for the quantity of the commodity material.
10. The computer method of claim 1, wherein determining that the ask price and the bid price meet a match criterion includes determining that the bid price is greater than or equal to the ask price plus a transaction fee.
11. The computer method of claim 1, wherein receiving the first cryptocurrency transaction from the buyer wallet into the transaction wallet comprises receiving a fungible cryptocurrency.
12. The computer method of claim 1, wherein receiving the first cryptocurrency transaction comprises receiving a distributed ledger token corresponding to a quantity of a second commodity material different than the commodity material.
13. The computer method of claim 1, further comprising:
displaying a property of the commodity material in the GUI.

14. The computer method of claim 13, wherein the property includes a commodity grade.
15. The computer method of claim 1, further comprising:
displaying price information about the commodity quantity in the GUI.
16. The computer method of claim 15, wherein displaying the price information includes displaying a price history for previous quantities of the commodity material.
17. The computer method of claim 15, wherein displaying the price information includes displaying a modeled price for the commodity material.
18. The computer method of claim 1, wherein the quantity of commodity material comprises a particular distinguishable instance of the commodity material.
19. The computer method of claim 1, wherein the commodity material comprises an in-ground ore or coal.
20. The computer method of claim 19, wherein the quantity comprises a ton.
21. The computer method of claim 19, wherein the quantity comprises a metric tonne.
22. The computer method of claim 19, wherein the quantity comprises a quantity of refined metal produced from the in-ground ore.
23. The computer method of claim 1, wherein the commodity material is to be produced at a future date.

24. The computer method of claim 1, wherein the commodity material exists in a transportable form at the moment of distributed ledger token issuance.
25. The computer method of claim 1, wherein the commodity material comprises mined ore or coal.
26. The computer method of claim 1, wherein the commodity material comprises natural gas.
27. The computer method of claim 26, wherein the commodity material comprises liquefied natural gas.
28. The computer method of claim 26, wherein the quantity comprises a number of standard cubic feet.
29. The computer method of claim 26, wherein the quantity comprises a unit of mass.
30. The computer method of claim 26, wherein the quantity comprises a unit of energy.
31. The computer method of claim 26, wherein the commodity material comprises a portion of a natural gas deposit.
32. The computer method of claim 1, wherein the commodity material comprises an agricultural product.
33. The computer method of claim 1, further comprising:
receiving a second ask price for the distributed ledger token at a later date;

wherein the distributed ledger token represents the same distinguishable instance of the commodity material as when the distributed ledger token was issued.

34. The computer method of claim 1, further comprising:
receiving notice that the distinguishable instance of the commodity material is delivered;
receiving payment for the delivered commodity material; and
redeeming the distributed ledger token for a currency corresponding to the received payment.

35. The computer method of claim 34, wherein the distributed ledger token is burned when redeemed.

36. The computer method of claim 34, wherein the value of the distributed ledger token is reset to zero when redeemed.

37. The computer method of claim 1, wherein the value of the distributed ledger token is set to equal the current value of the quantity of the commodity material.

38. The computer method of claim 37, whereby the distributed ledger token is asset-backed by the distinguishable instance of commodity material it is issued to represent.

39. A non-transitory computer-readable medium carrying computer instructions to cause a computer to execute a method, comprising:
receiving, via a first graphical user interface (GUI) from a seller, an ask price for a quantity of a commodity material, denominated in a first currency;
receiving, via a second GUI from a buyer, a bid price for the quantity of the commodity material, denominated in a second currency;

determining that the ask price and the bid price meet a match criterion;
receiving a first cryptocurrency transaction corresponding to the bid price from a buyer wallet into a transaction wallet;
transmitting a second cryptocurrency transaction corresponding to the ask price from the transaction wallet to a seller wallet;
issuing a distributed ledger token corresponding to the quantity of the commodity material; and
transmitting the distributed ledger token to the buyer wallet.

40. A computer system, comprising:

a webserver configured to output a first GUI to a first device for a seller and to receive an ask price for a quantity of a commodity material, to output a second GUI to a second device for a buyer, and to receive a bid price for the quantity of the commodity material; and

a server computer, operatively coupled to the webserver, and configured to determine that the ask price and the bid price meet a match criterion, to authorize first and second cryptocurrency transactions to respectively transfer the ask price to the seller and receive the bid price from the buyer, and to transmit said authorizations to the webserver.

41. The computer system of claim 40, further comprising:

a plurality of devices operatively coupled to the webserver and carrying the distributed ledger;

wherein the webserver is configured to transmit the authorized first and second cryptocurrency transactions to the plurality of devices;

wherein the plurality of devices are configured to collectively validate the first and second cryptocurrency transactions; and

wherein the webserver is configured to receive and forward collective validation to the server computer.

42. The computer system of claim 40, wherein the server computer is further configured to:

- receive a first cryptocurrency transaction corresponding to the bid price from a buyer wallet to a transaction wallet via the webserver;

- transmit a second cryptocurrency transaction corresponding to the ask price from the transaction wallet to a seller wallet via the webserver;

- issue a distributed ledger token corresponding to the quantity of the commodity material; and

- cause the webserver to transmit the token to the buyer wallet.

43. A computer method for conveying value associated with a commodity, comprising:

- issuing, with a server computer, a distributed ledger token corresponding to a distinguishable instance of a commodity; and

- outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity;

- wherein the distributed ledger token represents ownership of the distinguishable instance of the commodity.

44. The computer method for conveying value associated with a commodity of claim 43, further comprising:

- receiving, via the web server, availability data from a seller device indicating availability of the distinguishable instance of the commodity.

45. The computer method for conveying value associated with a commodity of claim 44, wherein the availability data is indicative of current availability of the distinguishable instance of the commodity.

46. The computer method for conveying value associated with a commodity of claim 44, wherein the availability data is indicative of a planned availability of the commodity.

47. The computer method for conveying value associated with a commodity of claim 44, wherein receiving the availability data comprises receiving the data as an encrypted transaction on the distributed ledger.

48. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token comprises issuing a public blockchain token.

49. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token comprises issuing a permissioned blockchain token.

50. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token comprises issuing a private blockchain token.

51. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token corresponding to the distinguishable instance of the commodity comprises:

- parsing property data related to one or more physical properties of the distinguishable instance of the commodity;
- hashing the property data; and
- adding the property data onto the distributed ledger as a transaction.

52. The computer method for conveying value associated with a commodity of claim 51, further comprising:

receiving property data from a seller device, the data corresponding to the one or more physical properties.

53. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token corresponding to the distinguishable instance of the commodity comprises:

- parsing property data related to a mass or volume of the distinguishable instance of the commodity;
- hashing the property data; and
- adding the property data onto the distributed ledger as a transaction.

54. The computer method for conveying value associated with a commodity of claim 53, further comprising:

- receiving property data from a seller device, the data corresponding to the one or more physical properties.

55. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token corresponding to the distinguishable instance of the commodity comprises:

- parsing availability data related to a projected date or time of availability of the distinguishable instance of the commodity;
- hashing the availability data; and
- adding the availability data onto the distributed ledger as a transaction.

56. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token corresponding to the distinguishable instance of the commodity comprises:

- parsing availability data related to a location of the distinguishable instance of the commodity;
- hashing the availability data; and
- adding the availability data onto the distributed ledger as a transaction.

57. The computer method for conveying value associated with a commodity of claim 56, further comprising:

receiving availability data from a seller device, the data corresponding to the one or more physical properties.

58. The computer method for conveying value associated with a commodity of claim 43, wherein issuing the distributed ledger token corresponding to the distinguishable instance of the commodity comprises:

parsing availability data related to a position of the distinguishable instance of the commodity in a sequence of distinguishable instances of the commodity;

hashing the availability data; and

adding the availability data onto the distributed ledger as a transaction.

59. The computer method for conveying value associated with a commodity of claim 58, further comprising:

receiving availability data from a seller device, the data corresponding to the one or more physical properties.

60. The computer method for conveying value associated with a commodity of claim 43, further comprising:

receiving, via the web server, certification data corresponding to a certification of one or more parameters corresponding to the distinguishable instance of the commodity.

61. The computer method for conveying value associated with a commodity of claim 60, wherein receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity comprises receiving certification data from the seller.

62. The computer method for conveying value associated with a commodity of claim 60, wherein receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity comprises receiving data from a third party.

63. The computer method for conveying value associated with a commodity of claim 60, wherein receiving certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity comprises receiving data from an automated measurement device.

64. The computer method for conveying value associated with a commodity of claim 60, further comprising adding the certification data corresponding to the certification of one or more parameters corresponding to the distinguishable instance of the commodity onto the distributed ledger token.

65. The computer method for conveying value associated with a commodity of claim 64, wherein the certification data is added onto the distributed ledger token as metadata.

66. The computer method for conveying value associated with a commodity of claim 64, wherein the certification data is added onto the distributed ledger token as an encrypted transaction.

67. The computer method for conveying value associated with a commodity of claim 64, wherein the certification data is added onto the distributed ledger token at the moment of issuance.

68. The computer method for conveying value associated with a commodity of claim 64, wherein the certification data is added onto the distributed ledger token after issuance of the distributed ledger token.

69. The computer method for conveying value associated with a commodity of claim 64, wherein establishing at least a first value occurs after adding the certification data onto the distributed ledger token.

70. The computer method for conveying value associated with a commodity of claim 43, further comprising:

- transferring ownership of the distributed ledger token from a seller to a buyer;

- wherein transferring ownership of the distributed ledger token also transfers ownership of the distinguishable instance of the commodity corresponding to the distributed ledger token.

71. The computer method for conveying value associated with a commodity of claim 70, wherein transferring ownership of the distributed ledger token comprises:

- establishing, using at least the server computer, a selling valuation and a corresponding buying valuation for the distributed ledger token;

- receiving, via the web server, an acceptance of at least one of the selling valuation or the buying valuation;

- receiving, via the web server, a cryptocurrency, second distributed ledger token, or cryptocurrency and second distributed ledger token transaction equal to the buying valuation from at least one buyer resource;

- transmitting, via the web server, the distributed ledger token to the at least one buyer resource; and

- transmitting, via the web server, a cryptocurrency, second distributed ledger token, or cryptocurrency and second distributed ledger token transaction equal to the selling valuation to at least one seller resource.

72. A non-transitory computer readable medium carrying computer instructions capable of causing a computer to execute a method comprising:

issuing, with a server computer, a distributed ledger token corresponding to a distinguishable instance of a commodity; and

outputting, with a web server for display via a graphical user interface (GUI) on a user device, information corresponding to the distributed ledger token and the distinguishable instance of the commodity;

wherein the distributed ledger token represents ownership of the distinguishable instance of the commodity.

73. A computer system for conveying value associated with a commodity, comprising:

a web server operatively coupled to a first user device via the Internet, the web server being configured to receive commodity availability data from the first user device; and

at least one server computer operatively coupled to the web server, the server computer being configured to receive the commodity availability data from the web server, and issue a distributed ledger token corresponding to a distinguishable instance of the available commodity;

wherein the server computer is further configured to credit the distributed ledger token to the first user in return for a smart contract that causes ownership of the distributed ledger token to legally represent ownership of the commodity distinguishable instance; and

wherein the server computer is configured to cooperate with the web server to transmit at least information related to the distributed ledger token and the commodity distinguishable instance represented thereby, via the Internet, for display in a GUI on the user device.

74. The computer system for conveying value associated with a commodity of claim 73, wherein the server computer is configured to cooperate with the web server to receive property data related to the commodity distinguishable instance from the seller device, and to publish the property data or pointer thereto onto the distributed ledger token.

75. The computer system for conveying value associated with a commodity of claim 73, wherein the server computer is configured to cooperate with the web server to receive property data related to the commodity distinguishable instance from a certification agent device, and to publish the property data or a pointer to the property data onto the distributed ledger token.

76. The computer system for conveying value associated with a commodity of claim 73, wherein the server computer is configured to cooperate with the web server to receive location, production, or movement data related to the distinguishable instance of the commodity from a production, transportation, or storage service device, and to publish the data or a pointer to the data onto the distributed ledger token.

77. The computer system for conveying value associated with a commodity of claim 73, wherein the server computer is configured to cooperate with the web server to receive location, production, property, or proof of existence or delivery data from an automated device, and to publish the data or a pointer to the data onto the distributed ledger token.

78. The computer system for conveying value associated with a commodity of claim 73, further comprising:

a plurality of stakeholder devices operatively coupled to the server computer, each stakeholder device holding at least a portion of the distributed ledger;

wherein issuing the distributed ledger token comprises transmitting data to at least a portion of the stakeholder devices.

79. The computer system for conveying value associated with a commodity of claim 78, wherein the plurality of stakeholder devices include the seller device and at least one buyer device.

80. The computer system for conveying value associated with a commodity of claim 78, wherein the server computer is configured to operate as an oracle to add real-world data to the distributed ledger.

81. The computer system for conveying value associated with a commodity of claim 73, further comprising:

- a buyer device operatively coupled to the web server and the server computer;

- wherein the server computer and a plurality of stakeholder devices are configured to facilitate a swap of the distributed ledger token from a seller resource to a buyer resource.

82. A computer method for transferring an interest in a commodity, comprising:

- receiving, into a server computer from a first user via a graphical user interface (GUI) displayed on a remote user device and a network, a private key and an image of a proof of ownership of a distinguishable instance of a commodity;

- generating a smart contract conveying conditional ownership of the distinguishable instance of the commodity;

- issuing, with the server computer, a first quantity of electronic tokens on a distributed ledger, the first quantity of electronic tokens carrying the smart contract such that the first quantity of electronic tokens are capable of collectively representing ownership of the distinguishable instance of the commodity;

- transferring at least a portion of the first quantity of electronic tokens to a first user electronic wallet corresponding to the first user;

- receiving, from the first user via the graphical user interface (GUI) displayed on the remote user device, an offer to sell at least a portion of the first quantity of electronic tokens;

listing at least a portion of the first quantity of electronic tokens on an electronic token exchange; and

transferring at least a portion of the first quantity of electronic tokens from the first user electronic wallet to a buyer wallet using an exchange settlement service disposed on a second server computer.

83. The computer method for transferring an interest in a commodity of claim 82, further comprising:

encrypting and storing the proof of ownership at a secret location; and

hashing data corresponding to the secret location onto the first quantity of electronic tokens using a distributed ledger transaction.

84. The computer method for transferring an interest in a commodity of claim 82, wherein the secret location comprises a networked storage address.

85. The computer method for transferring an interest in a commodity of claim 84, wherein the networked storage address is made secret by encrypting the networked storage address before hashing the encrypted storage onto the first quantity of electronic tokens on the distributed ledger.

86. The computer method for transferring an interest in a commodity of claim 82, wherein the smart contract condition is satisfied by binding transfer of the distinguishable instance of the commodity to the first quantity of electronic tokens and transfer of at least a portion of the first quantity of electronic tokens to the first user electronic wallet.

87. The computer method for transferring an interest in a commodity of claim 86, wherein the binding transfer of the distinguishable instance of the commodity includes signing the smart contract using the private key.

88. The computer method for transferring an interest in a commodity of claim 86, further comprising:

transmitting a public key to the electronic token exchange, the public key being configured to enable a buyer to view the proof of ownership without knowing the secret location.

89. The computer method for transferring an interest in a commodity of claim 82, wherein receiving, from the first user via a remote device, an offer to sell at least a portion of the first quantity of electronic tokens includes establishing an ask price for an electronic token.

90. The computer method for transferring an interest in a commodity of claim 89, wherein establishing an ask price for the electronic token includes receiving an ask price from the first user via the GUI displayed on the remote user device and the network.

91. The computer method for transferring an interest in a commodity of claim 82, wherein listing at least a portion of the first quantity of electronic tokens on an electronic token exchange and transferring at least a portion of the first quantity of electronic tokens from the first user wallet to a buyer wallet using an exchange settlement service disposed on a second server computer includes:

receiving a bid price from a buyer via a buyer device and the network;
determining that the ask price and the bid price meet a match criterion;
transferring the electronic token to a second user wallet corresponding to the second user; and
transferring a settlement price to the first user wallet.

92. The computer method for transferring an interest in a commodity of claim 91, wherein the settlement price is denominated in an electronic currency.