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This was filed on Nov. 5th, 2018 with a priority claim to Nov. 7th, 2017. I believe this application covers the tokenization of a commodity, security, or other physical asset, represented as a digital asset (RWA) on blockchain. This patent also covers trading these digital assets (RWAs) in a commodities or financial exchange, including immediate buy/sell transactions, options, forwards and/or futures, and swaps.

In this filing, I mentioned carbon or commodity, or a tokenized representation, that could be traded on an **"Internet-enabled trading system or financial exchange"** in the Abstract, and later explained in the Specification **"By implementing a carbon credit trading market based on the Blockchain designs discussed herein, as well as incorporating the carbon credit trading market into the IoT Platform implementation itself, the automation of carbon credit generation and monetization is possible.**

**[1691] Many aspects of the blockchain design are desirable for a commodity exchange and/or trading platform. However, a blockchain-based architecture isn't necessarily required to implement a carbon credit or expanded commodity exchange. Either form should support the notion of immediate buy/sell transactions, options, forwards and/or futures, and swaps."**

I also stated the following aspects of a token:

"A blockchain facilitates secure online transactions. A blockchain is a decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network. This allows the participants to verify and audit transactions inexpensively. They are authenticated by mass collaboration powered by collective self-interests. The result is a robust workflow where participants' uncertainty regarding data security is marginal. The use of a blockchain removes the characteristic of infinite reproducibility from a digital asset. It confirms that each unit of value was transferred only once, solving the long-standing problem of double spending. Blockchains have been described as a value-exchange protocol. This blockchain-based exchange of value can be completed more quickly, more safely and more cheaply than with traditional systems. A blockchain can assign title rights because it provides a record that compels offer and acceptance.

A blockchain database consists of two kinds of records: transactions and blocks. Blocks hold batches of valid transactions that are hashed and encoded into a Merkle tree. Each block includes the hash of the prior block in the blockchain, linking the two. Variants of this format were used previously, for example in Git. The format is not by itself sufficient to qualify as a blockchain. The linked blocks form a chain. This iterative process confirms the integrity of the previous block, all the way back to the original genesis block. Some blockchains create a new block as frequently as every five seconds. As blockchains age they are said to grow in height.

Sometimes separate blocks can be produced concurrently, creating a temporary fork. In addition to a secure hash-based history, any blockchain has a specified algorithm for scoring different versions of the history so that one with a higher value can be selected over others. Blocks not selected for inclusion in the chain are called orphan blocks. Peers supporting the database have different versions of the history from time to time. They only keep the highest scoring version of the database known to them. Whenever a peer receives a higher scoring version (usually the old version with a single new block added) they extend or overwrite their own database and retransmit the improvement to their peers. There is never an absolute guarantee that any particular entry will remain in the best version of the history forever. Because blockchains are typically built to add the score of new blocks onto old blocks and because there are incentives to work only on extending with new blocks rather than overwriting old blocks, the probability of an entry becoming superseded goes down exponentially as more blocks are built on top of it, eventually becoming very low. For example, in a blockchain using the proof-of-work system, the chain with the most cumulative proof-of-work is always considered the valid one by the network. There are a number of methods that can be used to demonstrate a sufficient level of computation. Within a blockchain the computation is carried out redundantly rather than in the traditional segregated and parallel manner.

By storing data across its network, the blockchain eliminates the risks that come with data being held centrally. The decentralized blockchain may use ad-hoc message passing and distributed networking. Its network lacks centralized points of vulnerability that computer crackers can exploit; likewise, it has no central point of failure. Blockchain security methods include the use of public-key cryptography**. A public key (a long, random-looking string of numbers) is an address on the blockchain. Value tokens sent across the network are recorded as belonging to that address. A private key is like a password that gives its owner access to their digital assets or otherwise interact with the various**

**capabilities that blockchains now support. Data stored on the blockchain is generally considered incorruptible.**

Every node or miner in a decentralized system has a copy of the blockchain. Data quality is maintained by massive database replication and computational trust. No centralized "official" copy exists and no user is "trusted" more than any other. Transactions are broadcast to the network using software. Messages are delivered on a best effort basis. Mining nodes validate transactions, add them to the block they are building, and then broadcast the completed block to other nodes. Blockchains use various time-stamping schemes, such as proof-of-work, to serialize changes. Alternate consensus methods include proof-of-stake and proof-of-burn. Growth of a decentralized blockchain is accompanied by the risk of node centralization because computer resources required to operate bigger data become more expensive.

The blockchain mechanism could be used for registering users of the IoT implementation, as well as registering all the equipment necessary to implement the carbon credit generation and monitoring software platform, potentially in a Cloud-computer based environment. One could foresee the blockchain implementation within a single Cloud-computing environment, or spanning across two or more Cloud-computing environments. If the blockchain implementation was spread across multiple Clouds, this would increase security as well as availability and stability of the entire system. All transactions could be recorded by the blockchain so that the entire IoT implementation benefits from the blockchain's benefits."

I believe this should cover any physical asset tokenized into a digital twin/asset (RWA) on blockchain.

To cover the notion of trading these digital assets in a commodities or financial exchange, including immediate buy/sell transactions, options, forwards and/or futures, and swaps, this patent includes the following detailed explanation of the transactions supported:

“[1557] The carbon credit trading market should support the following types of general trading transactions, known as market orders. What is a market order? A market order instructs a broker to buy or sell securities for your account at the next available price. It remains in effect only for the day, and usually results in the prompt purchase or sale of all the shares of carbon credits, options or contracts (potentially pre-market contracts that represent a purchase of carbon credits) as long as the security is actively traded and market conditions permit. Note: In order to maintain a fair and orderly market, most market centers generally do not accept cancellation requests after 9:28 a.m. ET for market orders eligible for execution at 9:30 a.m. ET, when the market opens. Acceptance of a cancellation request by a broker between 9:28 and 9:30 a.m. ET does not guarantee an order cancellation. All requests to cancel an order are processed on a best-efforts basis.
[1558] What is a limit order? When you place a limit order to buy, the carbon credit is eligible to be purchased at or below your limit price, but never above it. You may place limit orders either for the day on which they are entered (a day order), or for a period that ends when it is executed or when you cancel (an open order or good 'til canceled (GTC) order). Note: All open GTC orders will expire 180 calendar days after they are placed. If the 180th day falls on a weekend or holiday, those orders will expire on the first business day following the expiration day. This policy does not apply to options.
[1559] Orders at each price level are filled in a sequence that is determined by the rules of the various market centers; therefore, there can be no assurance that all orders at a particular price limit (including yours) will be filled when that price is reached. Such orders are also subject to the existence of a market for that security. Thus, the fact that your price limit was reached does not guarantee an execution.
[1560] Limit orders for more than 100 shares or for multiple round lots (200, 300, 400, etc.) may be filled completely or in part until completed. It may take more than one trading day to completely fill a multiple round lot or mixed-lot order unless the order is designated as one of the following types:
[1561] All or none (fill the whole order or no part of it). When you place an all-or-none designation on your order, it is considered restricted. The carbon credit can trade at or below your price on a buy, or at or above on a sell, without the right to execution, unless the entire amount of your order is executable.
[1562] Immediate or cancel (fill the whole order or any part immediately, and cancel any unfilled balance). [1563] Fill or kill (fill the entire order immediately or cancel it).

[1564] Note: Good 'til canceled time in force is not available for short sales, unlisted corporate bonds and treasuries, mortgage-backed and agency bonds, and collateralized mortgage obligations (CMOs). We do not accept limit orders for municipal bonds, commercial paper, unit investment trusts (UITs), certificates of deposit (CDs), or mutual funds.

What is a Stop Order?

[1565] Stop orders are generally used to protect a profit or to prevent further loss if the price of a security moves against you. They can also be used to establish a position in a security if it reaches a certain price threshold or to close a short position.

[1566] The specialists on the various exchanges and market makers have the right to refuse stop orders under certain market conditions. Not all securities or trading sessions (pre- and post-market) are eligible for stop orders.

Types of Stop Orders

Stop Loss

[1567] This type of order automatically becomes a market order when the stop price is reached. Therefore, there is no guarantee that your order will be executed at the stop price.

[1568] It is important for investors to understand that company news or market conditions can have a significant impact on the price of a security. This could result in a stop loss order being executed at a price that is dramatically different than what your stop loss price indicates.

Stop Limit

[1569] This type of order automatically becomes a limit order when the stop price is reached. Like any limit order, a stop limit order may be filled in whole, in part, or not at all, depending on the number of shares available for sale or purchase at the time.

[1570] Note: Buy stop loss and buy stop limit orders must be entered at a price which is above the current market price. Sell stop loss and sell stop limit orders must be entered at a price which is below the current market price.

How Stop Orders are Triggered

Carbon Credits

[1571] Equity stop orders placed with a broker are triggered off of a round lot transaction of 100 shares or greater, or a print in the security. The market centers to which National Financial Services (NFS) routes a broker's stop loss orders and stop limit orders may impose price limits such as price bands around the National Best Bid or Offer (NBBO) in order to prevent stop loss orders and stop limit orders from being triggered by potentially erroneous trades. These price limits may vary by market center. If you are interested in placing an order which triggers off of a bid quote or ask quote, please see Trailing Stop Orders and Contingent Orders.

Options

[1572] Generally a stop order to buy becomes a market order when the bid price is at or above the stop price, or the option trades at or above the stop price. A stop order to sell becomes a market order when the ask price is at or below the stop price, or when the option trades at or below the stop price. The options stop election is based on the exchange's best bid or offer (BBO) where the stop order resides.

What Time Limitations can I Place on an Order?

[1573] You place a time limitation on a carbon credit trade order by selecting one of the following time-in-force types:

Day

[1574] A time-in-force limitation on the execution of an order. This limitation has a default order expiration time of 4:00 p.m. ET. You may select your own order expiration time between 10:00 a.m. ET and 4:00 p.m. ET in thirty-minute increments (i.e., 10:00 a.m., 10:30 a.m., 11:00 a.m., etc). If all or part of your order is not executed by the time you've selected for expiration, your order will be canceled. You may view the status of your order, including order expiration date and/or time, on the Orders page.

Good 'Til Canceled

[1575] A time-in-force limitation that can be placed on a carbon credit or ETF order. This limitation has a default order expiration date of 180 calendar days from the order entry date at 4:00 p.m. ET. You may select your own order expiration date and/or time, up to 180 calendar days from the order entry date. If all or part of your order is not executed by the date and/or time you've selected for expiration, any open portions of your order will be canceled. You may view the status of your order, including order expiration date and/or time on the Orders page.

Fill or kill [1576] A time-in-force limitation that can be placed on the execution of an order. This limitation requires that the order is immediately completed in its entirety or canceled. [1577] Orders with the fill or kill limitation: [1578] are for 100 shares or more [1579] are only placed during market hours [1580] are good only for the current day [1581] are not allowed for use with stop loss, stop limit, or sell short orders

[1582] Note: Fill or kill is only used under very special circumstances. If you do not fully understand how to use fill or kill, talk to a broker before placing this limitation of an order.

Immediate or Cancel

[1583] A time-in-force limitation that can be placed on the execution of an order. This limitation requires that a broker immediately enter a bid or offer at a limit price you specify. All or a portion of the order can be executed. Any portion of the order not immediately completed is canceled.

On the Open

[1584] A time-in-force limitation that can be placed on an order. This limitation requires that the order is executed as close as possible to the opening price for a security. All or any

part of the order that cannot be executed at the opening price is canceled.
On the Close
[1585] A time-in-force limitation that can be placed on the execution of an order. This limitation requires that the order is executed as close as possible to the closing price for a security. All or any part of the order that cannot be executed at the closing price is canceled.
How are Commissions Assessed for Good 'Til Canceled Orders?
[1586] The commission for a good 'til canceled order is assessed at the time your order is executed. [1587] If your order receives multiple executions on a single day, you will be assessed one commission. For good 'til canceled orders that receive executions over multiple days, a commission is assessed for each day in which there is an execution.
[1588] Good 'til canceled orders that do not execute are not charged a commission.
How do Dividend Distributions Affect Open Orders?
[1589] Although different exchange rules may exist for adjusting orders when a security pays a dividend, the general rule is that good 'til canceled (GTC) orders below the market are adjusted for the dividend amount. The price of your order will be automatically reduced on the “ex-dividend” date by approximately the amount of the upcoming dividend unless you note it as a do not reduce (DNR) when you place the order. Orders below the market include: buy limit, sell stop loss, sell stop limit, sell trailing stop loss, sell trailing stop limit.
What are the Risks of Trading in Volatile Markets?
[1590] Volatile markets can present higher trading risks, especially when you are using electronic services to access information or place orders. Consider placing limit orders instead of market orders. In certain market conditions, or with certain types of securities offerings (in this implementation, carbon credits), price changes may be significant and rapid during regular or after-hours trading. In these cases, placing a market order could result in a transaction that exceeds your available funds, meaning that a broker would have the right to sell other assets in your account to cover any outstanding debt. This is a particular risk in accounts that you cannot easily add money to, such as retirement accounts.
[1591] Be aware that quotes, order executions, and execution reports could be delayed. During periods of heavy trading or volatility, quotes that are provided as “real time” may be stale—even if they appear not to be—and you may not receive every quote update. Security prices can change dramatically during such delays. When canceling an order, be sure your original order is actually canceled (verified canceled order status) before entering a replacement order. Don't rely on a receipt for your cancellation order; that order may have arrived too late for us to act on. Cancellation requests are handled on a best-efforts basis. Use other ways to access a broker during peak volume times. System availability and response time may be subject to market conditions. If you are having problems reaching us

one way, try another. There are several ways to contact a broker.
[1592] The chances of encountering these risks are higher for individuals using day trading strategies. In part for this reason, a broker does not promote day trading strategies. For more information on trading risks and how to manage them, contact a broker.
Advanced Order Types
What is a Trailing Stop Order?
[1593] Trailing Stop Orders adjust automatically when market conditions move in your favor, and can help protect profits while providing downside protection. With a Trailing Stop Order, you do not have to constantly adjust for price changes.
[1594] Additionally, Trailing Stop Orders may have increased risks due to their reliance on trigger processing, market data, and other internal and external system factors. These orders are held in a separate order file with a broker and are not sent to the marketplace until the order conditions you've defined have been met.
Eligible Securities:
[1595] Listed and OTC Equities [1596] Single-leg Options
Types of Trailing Stop Orders:
[1597] Trailing Stop Loss: Once triggered, the order will become a market order. [1598] Trailing Stop Limit: Once triggered, the order will become a limit order.
Trailing Stop Order Trigger Values:
[1599] You may elect to trigger a Trailing Stop order based on the following security market activities: [1600] The security's last round lot trade of 100 shares or greater (default) [1601] The security's bid price [1602] The security's ask price
Trailing Stop Order Time Limits:
[1603] Trailing Stop orders can be either Day orders or Good 'til Canceled (GTC) orders.
[1604] GTC orders placed on a broker expire after 180 days.
Trailing Stop Order Trail Values:
[1605] Equity Trailing Stop orders can be set with a percentage (%) or dollar ($) trail value.
[1606] Single-leg Option Trailing Stop orders can only be set with a dollar ($) trail value.
Important information regarding Trailing Stop Orders.
[1607] Example of a Trailing Stop Order [1608] trailing stop [1609] 1. You buy carbon credits at $25 per share. [1610] 2. carbon credits rises to $27. [1611] 3. You place a sell trailing stop loss with a trail value of $1. [1612] 4. As long as the price moves in your favor, your trailing price will stay $1 away. [1613] 5. The price of carbon credits peaks at $29, then starts to drop. Your trailing stop loss remains at $28. [1614] 6. Shares are sold when carbon credits reaches $28.
What is a Conditional Order?
[1615] A conditional order allows you to set order triggers for carbon credits and options based on the price movement of carbon credits, indices, or options contracts. There are

five types: Contingent, Multi-Contingent, One-Triggers-the-Other (OTO), One-Cancels-the-Other (OCO), and One-Triggers-a-One-Cancels-the-Other (OTOCO).

Contingent

[1616] A Contingent order triggers an equity or options order based on any 1 of 8 trigger values for any carbon credits, or any valid options contract. [1617] Trigger values: last trade, bid, ask, volume, change % up, change % down, 52-week high, and 52-week low [1618] Market, limit, stop loss, and trailing stop loss are available order types once the contingent criterion is met. [1619] Security type: carbon credits or single-leg options [1620] Time-in-force: For the contingent criteria and for the triggered order, it can be for the day, or good 'til canceled (GTC). The time-in-force for the contingent criteria does not need to be the same as the time-in-force for the triggered order.

Example of a Contingent Order

[1621] contingent [1622] 1. You place a Contingent order to buy carbon credits at a limit of $25—if the UVW index moves up more than 1.25%. [1623] 2. A rally occurs that pushes the index up 1.30% on the day . . . . [1624] 3 . . . which triggers a limit order to buy carbon credits at $25. [1625] 4. carbon credits hits your limit of $25 so shares are bought.

[1626] Multi-Contingent [1627] A Multi-Contingent order triggers an equity or option order based on a combination of 2 trigger values for any carbon credits. The criteria can be linked by “And at the same time,” “Or,” or “Then.” [1628] “And at the same time” is chosen if both criteria must be met at the same time. [1629] “Or” is chosen if either one of the two criteria must be met. [1630] “Then” is chosen if the criteria must be met in sequential order. [1631] Trigger values: last trade, bid, ask, volume, change % up, change % down, 52-week high, and 52-week low [1632] Security type: carbon credits or single-leg options [1633] Time-in-force: For the contingent criteria and for the triggered order, it can be for the day, or good 'til canceled (GTC). The time-in-force for the contingent criteria does not need to be the same as the time-in-force for the triggered order.

Example of a Multi-Contingent Order

[1634] multi contingent [1635] 1. You purchase carbon credits at $25 and place a Multi-Contingent order to sell carbon credits at the market if . . . . [1636] 2A. . . . carbon credits last trade is less than $20 . . . . [1637] 2B. . . . or carbon credits hits a new 52-week high of $32. [1638] 3. carbon credits move up to $32 which triggers your order to sell. You order fills at $32.01.

[1639] One-Triggers-the-Other (OTO) [1640] A One-Triggers-the-Other order actually creates both a primary and a secondary order. If the primary order executes, the secondary order automatically triggers. [1641] This type of order can help you save time: place a buy order as your primary order and a corresponding sell limit, sell stop, or sell trailing stop at the same time. Or, if you trade options regularly, use an OTO order to leg into a buy-write or covered-call position. [1642] Trailing stop orders are available for either or both legs of the

OTO. [1643] Security type: Any combination of carbon credits and/or single-leg options [1644] Time-in-force: Can be different for each order [1645] For OTO orders that are good 'til canceled (GTC), the whole order is good for 180 days (e.g., if the primary order executes on day 30, the secondary order is live for 150 days). [1646] If the primary order is canceled, the secondary order is also canceled. [1647] If the secondary order is canceled, the primary order remains open as a separate order,

Example of One-Triggers-the-Other Order

[1648] one triggers [1649] 1. You place an OTO to buy carbon credits at $30 and sell at a $2 trailing stop loss. [1650] 2. The carbon credits drops to $30, which triggers a buy order of carbon credits that executes and . . . . [1651] 3 . . . a sell trailing stop loss order with a $2 trail is placed with an initial trigger price of $28. [1652] 4. carbon credits moves up to $35 . . . . [1653] 5 . . . so the new trigger price for the trailing stop order is $33. [1654] 6. carbon credits trades down to $33, which triggers the trailing stop order and shares are sold at the market. [1655] One-Cancels-the-Other (OCO) [1656] With a One-Cancels-the-Other (OCO) order, two orders are live so that if either executes, the other is automatically triggered to cancel. [1657] When orders are placed for retirement accounts, a price-reasonability check helps prevent both OCO orders from executing in a fast market. This feature does not exist in nonretirement accounts. [1658] Security type: Any combination of carbon credits or single-leg options [1659] Time-in-force: Must be the same for both orders [1660] Orders can be for the same shares of the same carbon credits or option contracts, but on opposite sides of the market (sell limit and sell stop).

Example of One-Cancels-the-Other Order

[1661] one cancels [1662] 1. You buy carbon credits at $23. [1663] 2. carbon credits rises to $25. [1664] 3. You place an OCO with a sell order of $27 and . . . . [1665] 4 . . . a sell stop at $24. [1666] 5. carbon credit hits $27, so your sell order executes and . . . . [1667] 6 . . . your sell stop order is canceled. [1668] One-Triggers-a-One-Cancels-the-Other (OTOCO) [1669] With a One-Triggers-a-One-Cancels-the-Other order, you place a primary order which, if executed, triggers two secondary orders. [1670] If either of these secondary orders executes, the other is automatically canceled. [1671] Security type: Any combination of carbon credits or single-leg options [1672] Time-in-force: Primary can be different than both secondary orders. However, both secondary orders must have the same time-in-force.

Example of One-Triggers-a-One-Cancels-the-Other Order

[1673] One-Triggers-Cancel-Other [1674] 1. You place an order to buy carbon credits at $25. [1675] 2. At the same time, you place two sell orders, one at stop loss for $23 and one at a limit of $27. [1676] 3. carbon credits trades at $25. [1677] 4. Your buy order executes. [1678] 5. Simultaneously, your two sell orders are triggered. [1679] 6. carbon credits drops to $23. [1680] 7. Your stop loss order executes and your limit order is automatically

canceled.
What is Short Selling?
[1681] Short selling is an advanced trading technique that allows you to integrate a number of different strategies into your overall investment approach so that you may potentially profit from downward moves in a particular carbon credits. All short sale orders are subject to the availability of the carbon credits being sold, which must be confirmed by our carbon credits loan department prior to the order being entered.
Potential Uses of Short Selling:
[1682] Hedge current portfolio by short selling similar carbon credits or ETFs when you think the market may go down in the short term but don't want to sell the carbon credits you own to incur short-term capital gains. [1683] Profit from the decline of a particular carbon credit, an entire industry, or the overall market. [1684] Extend a bearish position when in-the-money calls you've written are exercised.
Example of a Short Sale
[1685] short_selling [1686] 1. Seller shorts carbon credits at price A. A broker finds shares that can be borrowed for delivery. [1687] 2. Three trading days later, on settlement date, a broker provides shares for delivery. Seller then pays a variable interest rate on loan of shares for as long as the short position is maintained. [1688] 3. Seller enters a buy to cover order at price B. If the price is above the price at which it was originally sold short (B1), the short seller generally realizes a loss. If it is below the original selling price (B2), the short seller generally realizes a profit.* [1689] Note that other factors may have an impact on profit or loss of the trade.
[1690] By implementing a carbon credit trading market based on the Blockchain designs discussed herein, as well as incorporating the carbon credit trading market into the IoT Platform implementation itself, the automation of carbon credit generation and monetization is possible. All aspects of such a system should conform to the ISO standards mentioned herein, as well as potentially follow the guidelines provided by the American Carbon Registry.
[1691] Many aspects of the blockchain design are desirable for a commodity exchange and/or trading platform. However, a blockchain-based architecture isn't necessarily required to implement a carbon credit or expanded commodity exchange. Either form should support the notion of immediate buy/sell transactions, options, forwards and/or futures, and swaps.”