A method for processing a transaction includes receiving a notification of a change in status of physical goods or other event in a physical supply chain, and automatically transferring funds in response to the notification. The automatic transfer of funds may be performed according to a stored rule for automatically transferring the funds in response to the notification. Typically, the goods and the event are related to the party to which the funds are transferred. If the funds are a portion of an agreed-upon payment, one or more additional notifications may be received for one or more additional changes in status of the goods or other events in the physical supply chain, and additional portions of the payment are transferred in response to each additional notification.
Fig. 1
Other Banking Systems

Centralized Tracking System 101

Tracking Controller 301

Web Server 303

Tracking Database 302

Tracking Interface 304

Third Party System 305

RFID Scanner 306

Monetary items 308

RFID Tag 309

Fig. 3
Establish Terms 501

First Event in Physical Supply Chain 502

Notification of First Event 503

Transfer First Portion of Payment 504

Final (Nth) Event Fulfilling Terms 505

Notification of Final Event 506

Transfer Final Portion of Payment 507

Fig. 5
PROCESSING TRANSACTIONS IN CONNECTION WITH A PHYSICAL SUPPLY CHAIN

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND

[0002] The cash supply chain is manual, complex, has inherent risk issues, and is dispersed throughout a network of customers, armored carriers, the Fed (Federal Reserve), and/or a network of client facing devices including but not limited to automatic teller machines (ATMs), cash vaults, banking centers, safes, cash recyclers, and other cash handling devices. The costs of depositing, distributing, and managing cash across a major bank, as well as the amount of daily excess cash carried by such a bank, can be on the order of billions of dollars.

[0003] Today’s client deposit process does not adequately allow clients to view the status of their deposit bag as it makes its way from the client’s site where the deposit was prepared to the bank or bank’s representative who will continue the processing of the deposit. Deposit bags are handled multiple times in the current process (and possibly by many different parties), which increases potential errors and complicates finding missing deposits or understanding where errors occurred and assigning fiduciary responsibility for those errors. Pertinent pieces of deposit data are typically manually entered and reentered into various systems throughout the end-to-end processing of the deposit. The collaboration and sharing of information across multiple organizations and with multiple vendors may make this process very complex and increases risk to the bank and bank clients.

[0004] For example, current services offered by banks have little connection or integration with physical supply chains in which the banks’ clients may be involved. Payment for transactions involving the physical supply chain typically require manual initiative for execution, and payments are typically not made until a formal bill or invoice is received, making the payment process slower and less efficient. Still other disadvantages of modern systems and methods are recognized by those skilled in the art.

BRIEF SUMMARY

[0005] Aspects as described herein are directed to tracking monetary packages, which may contain monetary items such as foreign and domestic government-issued legal-tender paper currency, coins, checks, coupons, food stamps, credit cards, negotiable money orders, and/or other negotiable instruments as well as non-negotiable collateral information, throughout the cash supply chain. In carrying out daily financial transactions, it is typical for monetary packages to be physically transferred between various parties, such as but not limited to a bank client (or a client of another financial institution who is leveraging the services of the bank), a transporter (e.g., an armored carrier), a bank vault, and even various stations within a bank vault. This transfer amongst various parties is referred to as the cash supply chain. Because many types of cash are reusable/recyclable, the same physical cash is usually cycled through the cash supply chain multiple times.

[0006] For transport through the cash supply chain, a financial transaction such as a deposit including one or more monetary items is normally bundled or otherwise packaged together as a monetary package. Depending upon the location within the cash supply chain, the monetary package may maintain together a quantity of monetary items as a single entity by way of, e.g., a bag (in which the monetary items are placed within the bag, which may be sealed), by way of a cassette for holding the monetary items, and/or by way of one or more straps (which may also be within the bag).

[0007] While a number of techniques to automate transaction handling have been attempted, there remains a need to improve the efficiency and accuracy of the financial transaction process. Consequently, it is desirable to increase the speed and accuracy of the financial transactions and to reduce the labor required to perform the transactions. It is also desirable to make information relating to the financial transaction and to reduce the labor required to perform the transactions. This information is also available to the financial institutions and to the bank, and to identify more quickly problematic locations in the financial transaction, identify potential, fraud or embezzlement, and identify industry trends. Information about a deposit or withdrawal, for instance, should be provided in an expedited fashion as it is processed along a cash supply chain, where notification/reporting is customizable and automatic for enhancing the client’s experience and for improving internal processes of a bank.

[0008] According to further aspects, monetary packages are tracked via a centralized tracking system that communicates with the various parties handling the monetary packages throughout the entire supply chain and/or when a carrier is set to arrive. Each time a monetary package changes status in the cash supply chain (i.e., transfers from one party to another or changes physical location), an involved party (e.g., the party receiving the monetary package and/or the party providing the monetary package) updates the centralized tracking system with the status. The centralized tracking system may be updated using a network of automated sensors that do not necessarily require the intervention of a party to create the update. These updates may be communicated to the centralized tracking system (system of record) in real time or near real time. Such a centralized tracking system may allow the bank or other service provider to offer a variety of services to the client.

[0009] For instance, centralized monetary package tracking may allow for more accurate reporting of monetary package status. And, by pre-scheduling (initiation) of deposits and change orders into the centralized tracking system, anomalies in the transport of a monetary package (e.g., a lost or delayed monetary package) may be recognized much earlier, even prior to actual deposit or arrival of the package at the processing site.

[0010] According to one aspect, a method for processing a transaction includes receiving a notification of a change in status of physical goods or other event in a physical supply chain, and automatically transferring funds in response to the notification. The automatic transfer of funds may be performed according to a stored rule for automatically transferring the funds in response to the notification. Typically, the
goods and the event are related to the party to which the funds are transferred. The funds may be transferred pursuant to a pre-existing agreement between the party and a second party involved in the transfer.

[0011] According to another aspect, the funds represent a portion of an agreed-upon payment for sale of physical goods. In this instance, one or more additional notifications may be received for one or more additional changes in status of the goods or other events in the physical supply chain, and additional portions of the payment are transferred in response to each additional notification.

[0012] According to yet another aspect, a method for processing a transaction includes establishing a relationship with a party and providing the party control to create a rule for automatic transfer of funds in response to receiving a notification of a specified change in status of goods or other event in a physical supply chain. The funds transferred are owned or otherwise controlled by the party, such as money in an account or a credit line granted to the party. Accordingly, in many instances, the relationship will be an account relationship established between a financial institution and a client of the institution. Typically, the party may specify which changes in status or other events give rise to automatic transfer of funds.

[0013] According to a further aspect, the funds transferred represent a portion of an agreed-upon payment for sale of physical goods. In this example, the party can be provided control to create additional rules for automatic transfer of additional portions of the agreed-upon payment from the funds in response to receiving a notification of another specified event in the physical supply chain.

[0014] According to a still further aspect, a system or a computer-readable medium may be provided with components or instructions to perform one or more aspects of the methods described above, as well as additional actions.

[0015] These and other aspects of the disclosure will be apparent upon consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] A more complete understanding of the present disclosure and the potential advantages of various aspects described herein may be acquired by referring to the following description in consideration of the accompanying drawings, in which like reference numbers indicate like features, and wherein:

[0017] FIG. 1 is a graphical depiction of an illustrative cash supply chain for a deposit/withdrawal lifecycle, including a centralized tracking system;

[0018] FIG. 2 is a graphical depiction of an illustrative cash supply chain for a change order lifecycle, including a centralized tracking system;

[0019] FIG. 3 is a functional block diagram of an illustrative monetary package tracking environment;

[0020] FIG. 4 is a graphical depiction of an illustrative physical supply chain in connection with a financial institution processing a transaction; and

[0021] FIG. 5 is a flow diagram of an illustrative method for processing a transaction in connection with a physical supply chain.

DETAILED DESCRIPTION

[0022] FIG. 1 is a graphical depiction of an illustrative cash supply chain for a monetary item deposit/withdrawal lifecycle. In this example, a centralized tracking system 101 communicates with various parties, such as a bank client 102, a deposit location 103, an armored carrier 104 or other transport service, a bank vault 105, and a pickup location 106. Communication between centralized tracking system 101 and the various parties 102-106 may be performed across any one or more communication media. Examples of communication media include, but are not limited to, a network such as the Internet, a local-area network or LAN, a wireless LAN or WLAN, and/or a telephone network such as a landline telephone network and/or a cellular telephone network. Other examples of communication media include a dedicated landline link and/or satellite or other wireless link. While not explicitly shown, monetary items may be processed internally within a node (e.g., within bank vault 105). Consequently, each node may have a network within itself.

[0023] Centralized tracking system 101 may include at least one computing device and at least one computer-readable medium that, together, are configured to receive monetary package status reports from parties such as parties 102-106, maintain data representing the monetary package status, and generate reports and alert messages from that monetary package status data. A “computing device” as referred to herein includes any electronic, electro-optical, and/or mechanical device, or system of physically separate such devices, that is able to process and manipulate information, such as in the form of data. Non-limiting examples of a computing device includes one or more personal computers (e.g., desktop or laptop), servers, personal digital assistants (PDAs), ultra mobile personal computers, smart phones, cellular telephones, pagers, and/or a system of these in any combination. In addition, a given computing device may be physically located completely in one location or may be distributed amongst a plurality of locations (i.e., may implement distributive computing). A computing device may even be a mobile device. Centralized tracking system 101 may further support co-operation with other non-bank tracking systems.

[0024] A computing device typically includes both hardware and software. The software may be stored on a computer-readable medium in the form of computer-readable instructions. A computing device may read those computer-readable instructions, and in response perform various steps as defined by those computer-readable instructions. Thus, any functions attributed to a computing device as described herein may be defined by such computer-readable instructions read and executed by that computing device, and/or by any hardware (e.g., a processor) from which the computing device is composed.

[0025] The term “computer-readable medium” as used herein includes not only a single medium or single type of medium, but also a combination of one or more media and/or types of media. Such a computer-readable medium may store computer-readable instructions (e.g., software) and/or computer-readable data (i.e., information that may or may not be executable).

[0026] Referring again to FIG. 1, bank client 102 may include not only registered customers of a bank that have a financial account (e.g., checking or savings account) maintained by the bank, but also customers that do not have a financial account with the bank but are otherwise doing business with the bank. Clients may also be another bank or a bank
agent or business partner including local, state, or federal
governments, and may also be extended to include a chain of
a bank’s customer’s customers. As will be discussed, bank
client 102 may receive a notification of an event along the
cash supply chain at phone 102a or terminal 102b through a
wireless network or the Internet.

[0027] Deposit location 103 is the location at which client
102 releases custody of the deposit (such as in the form of a
monetary package). This custody may be released by, for
instance, depositing the monetary into a cash handling device
e.g., a cash recycler, depository, exchange, dispensing
machine, or ATM), or at a bank teller, or even at the client’s
own location where an armored carrier would pick up the
deposit from the client. Pickup location 106 is the location at
which client 102 receives custody of the monetary items
(which may or may not be prepared by client 102 and which
may be in the form of a monetary package), such as from an
armored carrier, bank teller, or cash handling device.

[0028] Vault 105 is typically a secured location or device in
a bank or customer’s office where the deposit is processed. In
the case of a vault in an armored carrier’s or bank’s facility,
the deposits are processed, currency or other monetary items
are stored for storage and distribution. A vault may not
only process incoming monetary items but may also provide
monetary items such as currency to clients. These
requests for currency, commonly called “change orders”
are generally standing orders for specific amounts that are sent
on a specific schedule, but can be on-demand or non-standing
orders that are requested for a specific time. With some
embodiments, currency may be verified by the one
transporting the currency. This may be because the carrier is trusted
and in an appropriate liability agreement with the bank, or the
bank owns a carrier. In that case, some or all of the funds may
be verified (or trusted due to the device the funds came from)
and re-used in the cash supply chain without going to the
vault. For example, the carrier may use a handheld device to
check the next location to visit or receive notices that a site
needs cash. The carrier may use the verified cash to fulfill the
order.

[0029] Armored carrier 104a/104b (which may be referred
to as a “vendor”) transports monetary packages between
different stages along the cash supply chain typically in an
armored vehicle. The physical transportation could be any
type of transportation, however, including a courier or package
delivery service with a secured package.

[0030] Parties 102-106 may communicate with centralized
tracking system 101 over corresponding communications
channels. Different types of communications channels may
be supported. For example, centralization tracking system 101
may communicate with client 102 through a computer termi-
nal (via the Internet) and/or a wireless telephone, with an
armored carrier through a handheld scanner with a wireless
communications interface, and with a bank employee through
a workstation (e.g., via an intranet). A communications chan-
el may utilize different communications media, including
a wired telephone channel, wireless telephone channel, and/or
a wide area channel (WAN).

[0031] FIG. 2 is a graphical depiction of an illustrative cash
supply chain for a change order lifecycle. A change order is a
financial transaction in which a client (such as client 102)
requests and receives a predefined sum in a predefined set of
one or more denominations. For example, client 102 might
request a particular amount of currency with X amount of ten
dollar bills, Y amount of twenty dollar bills, and Z amount of
one dollar bills. While any type of client may implement a
change order, this type of transaction is particularly common
for business clients that require a certain amount of currency
in hand each day for their cash registers. With some embodi-
ments, a change order may be initiated by the bank using
forecasting systems for cash handling devices.

[0032] As can be seen in FIGS. 1 and 2, a monetary package
transfers from party to party, with the exception of the broken
line in FIG. 2 that indicates a request by client 102 rather than
a physical transfer of a monetary package. Each time the
monetary package changes hands and/or changes physical
locations, centralized tracking system 101 may be updated.
A physical location may have two different nodes, or within the same
node, of the cash supply chain. For example, monetary items
are typically moved from receiving of a vault to a teller of the
vault. In addition, any of these parties (or even other parties
not shown) may at any time query centralized tracking system
101 to determine the current status, historical status, and
planned future status of the monetary package. To aid in
tracking monetary packages, each monetary package may
physically include an identifying device having an associated
identifier that is unique to that monetary package. The iden-
tifying device may be any device that stores human-readable
and/or computer-readable information on some type of
medium. Examples of such an identifying device include a
radio-frequency identification (RFID) tag or other wirelessly
readable tag, a bar code or other visual label, or printed ink
made directly on or in the monetary package. The identifier
itself may be made up of any one or more symbols that
make one unique combination, such as one or more
numbers, letters, icons, dots, lines, and/or any one-, two-, or
higher-dimensional patterns.

[0033] FIG. 3 is a functional block diagram of an illustra-
tive monetary package tracking environment. In this example,
centralized tracking system 101 is shown to include a tracking
controller 301, tracking database 302, a web server 303, and
a tracking interface 304. Each of units 301, 303, and 304 may
be implemented as or otherwise include a computing device.
It should be noted that the divisions between functional
blocks in FIG. 3 is merely illustrative, and that the physical
division of computing devices and other equipment may
be different from the functional division. Moreover, some or all
of the functional blocks may be combined or further subdiv-
ised functionally and/or physically.

[0034] Tracking database 302 may be implemented as or
otherwise include a computer-readable medium for storing
data. This data may be organized, for instance, as a relational
database that is responsive to queries such as structured query
language (SQL) queries. Tracking database 302 may be
distributed and may collaborate with internal and/or external
sources to fulfill the completeness of the data utilized for
notifications.

[0035] In this example, tracking controller 301 may be
configured to add, edit, update, delete, and query data stored
in tracking database 302. The data stored in tracking database
302 may include, for instance, data indicating the current
status of each of a plurality of monetary packages. For
example, the data may indicate that a given monetary package
is with a particular armored carrier, and that it was transferred
to the armored carrier at a certain time and at a certain date. The
storing data may be associated with the unique identifier of the
relevant monetary package.

[0036] Web server 303 may be configured to generate an
Internet web page that is accessible by client 102 and/or other
parties. The web page may be used to query tracking database 302 via tracking controller 301. For example, a party using the web page may be able to enter an identifier associated with a monetary package. In response, web server 303 may request tracking controller 301 to query tracking database 302 (or alternatively web server 303 may generate the query itself) for that identifier. The query response is forwarded by tracking controller 301 to web server 303, and displayed on the web page for review by the party. The query response may include, for instance, the status data associated with the identifier. Many other types of query transactions are possible. In addition, updates, deletions, and additions may be made to the data in tracking database 302 via the web page generated by web server 303. For example, a party may desire to update status information about a particular monetary package via the web site, or may desire to add a new monetary package with a new identifier not previously included in tracking database 302.

Tracking interface 304 may be used as an alternative interface into tracking controller 301 and tracking database 302, without the need for an Internet web page. For example, data and queries may be provided to tracking controller 301 via tracking interface 304 using a short messaging system (SMS) message or other type of messaging from a cellular telephone.

FIG. 3 further shows an example of a third party system 305 (e.g., the computer system of armored carrier 104). System 305 may be embodied as or otherwise include a computing device, and may further include or be coupled with an identifier reader such as an RFID scanner 306 or a bar code reader. In this example, RFID scanner is configured to read an RFID tag 309 that is contained inside or otherwise attached to a bag 307 that also contains a quantity of monetary items 308. Using such a setup, the third party may, for example, read the identifier stored in RFID tag 309 using RFID scanner 306 (which may be a handheld or fixed location device), forward that identifier to tracking interface 304 or web server 303 along with the current status of bag 307 (e.g., in custody of the bank vault at a certain time and date). This current status may be added to the data in tracking database 302 and associated with the identifier. Then, when that party or another party later queries tracking database 302 for the same identifier, the status of bag 307, including the most recent status as discussed above, may be returned in response to the query.

RFID tag 309 may be a passive RFID tag that does not contain its own power source. Rather, a passive RFID tag (e.g., its memory, controller, and transmitter) is powered by power inherent to a signal that is received from RFID scanner 306 or another signal source. Alternatively, RFID tag 309 may be an active RFID tag that contains its own power source.

The above discussion in connection with FIGS. 1-3 describes but a few examples of how monetary package tracking might be implemented. These and other implementations, as well as various features that may be provided in connection with monetary package tracking, will be discussed in further detail below.

FIGS. 4 and 5 illustrate example embodiments of a system and method for processing a transaction in connection with a physical supply chain. Generally, the system includes a physical supply chain and a financial institution that is able to directly or indirectly monitor events occurring in the physical supply chain. The method generally involves executing a financial transaction or performing another action in connection with the occurrence of certain events in the physical supply chain. “Financial transactions” include all business transactions, including transactions for the sale or transfer of physical goods, services, securities, etc., as well as transactions that are purely monetary in nature. The monetary package tracking features described above and illustrated in FIGS. 1-3 can be used in connection with executing financial transactions in furtherance of these methods. Additionally, the monetary package tracking features can be incorporated into the physical supply chain in order to track positions of physical goods and detect events in the physical supply chain. “Events” in the physical supply chain include changes in status of the physical goods, such as shipment or delivery of goods, advancement of goods on a retailer’s storefront (e.g., placement of goods on a showroom floor or at a point of sale), confirmed satisfaction of quality control standards, the creation of another agreement or arrangement, the transfer of a payment for goods or other funds transfer, reaching a specified inventory level, another order for goods in the physical supply chain, etc. Such events can also include processing or re-processing of goods, including packaging or re-packaging of the goods, assembly of the goods, assembly or construction of other goods using the original goods, and other types of processing.

The embodiment of the system illustrated in FIG. 4 includes a physical supply chain 400 and a bank or other financial institution 407 in communication with the physical supply chain 400. The physical supply chain 400 in this example includes a plurality of points or parties, including a manufacturer 401, a distributor 402, a retailer 403, and a point of sale 404. Physical goods 405 are transferred along the physical supply chain 400 from one point to the next. The single unit of physical goods 405 illustrated in FIG. 4 may be a single product or a group of products, such as a container, pallet, SKU, etc. It is understood that the physical supply chain may contain additional or alternate parties, and may be more complex. For example, the physical supply chain may contain an intermediate packaging plant or assembly plant, or a delivery service for delivering goods between parties in the chain or for delivery to the ultimate consumer.

Generally, changes in status of the goods 405 or other events in the physical supply chain are detected or tracked. In the embodiment of FIG. 4, the physical goods contain an identifying device 406, such as an RFID tag, barcode, internal system transaction tracking code, or other such identifying device for tracking purposes, as described above and with regard to identifying device 309, that contains an identifier that distinguishes the particular goods 405 from other goods in the physical supply chain 400. It is understood that other tracking methods, such as those described above, can be used, including manual data entry. Each of the parties 401, 402, 403, 404 may have a detection device configured for detecting an identifier defined by the identifying device 406, such as an RFID scanner, barcode scanner, internal system transaction code detector, or other type of scanner, as described above. As shown in FIG. 4, each party is able to scan the goods 405 as the goods 405 are departing and/or as the goods 405 are arriving, and each party is capable of sending a notification to the financial institution 407 upon detection of departure or arrival of the goods 405, or upon registering another event in the physical supply chain 400 corresponding to the goods 405. The parties are also equipped for sending notifications to the bank 407 upon other events occurring in the physical supply chain, such as changes in
status of goods or other events as described above. In one embodiment, the notifications are electronic notifications transmitted between computer devices, but may be other types of notifications in other embodiments. The notifications may each include an indication of the type of event that has been detected, as well as an indication of the identifier(s) of the goods 405 involved in the event and/or an indication of when the event occurred. The notifications may be received at the financial institution 407 via, e.g., web server 303 and/or tracking interface 304.

In the example embodiment shown in FIG. 4, the financial institution 407 is configured for taking various actions, including transferring funds 408 to a recipient party 409, upon receiving the notification. The financial institution 407 may also be configured for transferring additional funds upon receiving additional notifications of additional specified events in the physical supply chain 400. In the embodiment illustrated, the financial institution 407 executes the financial transactions on behalf of a client 410, who may have an account relationship with the financial institution 407, such as a debit account, a loan or other line of credit, etc. In executing the transaction, the financial institution 407 may transfer funds controlled by the client 410 to the recipient 409. It is understood that in many instances, the recipient 409 and the client 410 will be parties in the physical supply chain 400 or will have some relationship with such parties. For example, in one embodiment, the recipient 409 may be the manufacturer 401, and the client 410 may be the distributor 402 and/or the retailer 403. It is further understood that the recipient 409 and/or any of the parties on the physical supply chain 400 (if different from the recipient 409 and client 410) may also be clients having financial account relationships with the financial institution 407.

As described above, the financial institution is configured for taking actions in furtherance of a financial transaction, such as transferring funds between parties, extending a line of credit, etc., in response to being notified of an event occurring in the physical supply chain 400. The financial transaction depends upon the type of event and/or the identity of the goods 405 (e.g., as identified by the identifier of identifying device 406). Rules or other terms may be established to govern which specific events in the physical supply chain 400 give rise to specific financial transactions or other actions to be performed in response thereto. For example, the rules may specify that funds are to be transferred from a first particular party to a second particular party responsive to notification of a shipment or arrival of the goods 405 from or to a specific point on the physical supply chain 400. As another example, the rules may require that the action taken (e.g., the funds transfer) be delayed by a certain amount of time beginning after notification is received (or beginning after the event is stated to have occurred). Similarly, in the case of a payment, the rules may require that a percentage of the payment be transferred immediately and the rest of the payment be delayed for a specified time. Generally, one or more parties in the physical supply chain 400 are allowed control to create and modify rules for a transaction as desired. In one embodiment, the rules are governed by a contract or other agreement negotiated between one or more of the involved parties, such as between the client 410 and the recipient 409. It is understood that any of the parties in the physical supply chain 400 may be parties to such an agreement, and that a plurality of these parties may be parties to one agreement. It is also understood that the rules may be governed by more than one agreement. In another embodiment, the financial institution 407 may provide a structured procedure and/or interface for allowing the party or parties to establish and control the rules. For example, the financial institution 407 may provide a form or application for establishing the rules. This form or application may be accessible, fillable, and/or receivable through the Internet (e.g., via web server 303), and it is understood that access may require authentication, as is known in the art. Limits may be placed on the party’s control over the rules. For example, the party may be permitted to select from a limited list of different events that will trigger transfers of funds.

In other embodiments, the financial institution 407 may be configured for taking other specified actions in response to received notifications. Such actions may be related to, or in furtherance of, a physical goods transaction or other financial transaction between two or more parties, but may alternately be unrelated to any transaction. Rules may be created for taking such actions, in the same manner as the rules described above. Additionally, the ultimate action taken in response to a received notification may be performed by a party other than the financial institution 407. Thus, the financial institution 407 may be configured to transmit a signal instructing the relevant party (the financial institution or third party) to perform the specified action. In one example, the rules may specify that inventory at a warehouse or retail store is to be restocked in response to some event in the physical supply chain, such as shipment of an order or reaching a certain inventory level. Accordingly, when the financial institution 407 receives a notification that the relevant event has occurred, the financial institution 407 transmits a signal to initiate a restocking order, according to the rules. In another example, the rules may specify that a new shipment/delivery order is to be placed in response to a certain event, such as a previous shipment reaching a specific point in the physical supply chain. Accordingly, when the financial institution 407 receives a notification that the relevant event has occurred, the financial institution 407 transmits a signal to initiate a new shipment, according to the rules. It is understood that a wide variety of different events and corresponding actions may be provided for in the rules, and the nature of such events and actions may not be limited.

As described above, the financial institution 407 is configured for executing a financial transaction or taking another action in response to receiving a notification of an event in the physical supply chain 400. In this embodiment, once the notification is received, the financial institution 407 determines the appropriate action to take in response. To do this, the financial institution 407 may have control of the centralized tracking system 101, which may be used to compare the type of event, time of event, and/or identity of the good corresponding to the event, with rules associated therewith in tracking database 302, as described below. For instance, a query may be made to tracking database 302, the query including the information described above. In response to the query, tracking database 302 may provide an indication of the appropriate action to take, such as transferring funds between particular parties at a particular time. Accordingly, in one embodiment, the tracking database 302 may contain data such as identifications of parties, specified events in the physical supply chain, goods identifiers, rules for taking specific actions in response to specific events, and other information. Such information may be correlated with other related information and organized in a useful manner, such as for queries.
For example, the rules may be stored and correlated with parties, events, actions, etc. in a “rules based database.” As known in the art, a rules based database can define dynamic rules that are interpreted in real-time according to a state of events, such as the events occurring in the physical supply chain. The information can be organized based on typical or common agreement terms, for example duration, movement, transfer, staged or termed events, etc. The structure of the database may be based on agreement type, market segment, client identity, etc. It is understood that small business transactions may not necessitate the same level of complexity as large corporate transactions in this regard, and that separate databases may be kept for each category of businesses.

In one embodiment, a financial transaction may include a payment to a recipient for a sale of goods and is configured to be processed in several portions or steps, as multiple events occur with respect to a single unit of goods along the physical supply chain. As described above, this unit of goods may include one product or a plurality of products, such as a shipment, pallet, SKU, etc. One such illustrative embodiment is shown in FIG. 5. In this embodiment, terms or rules are first established governing the transaction, at step 501, in a manner such as those described above. Generally, these rules are transmitted or otherwise made available to the financial institution 407 handling the payment, so that the financial institution 407 can properly respond to the notifications of the events specified in the rules. The financial institution 407 may store these rules in, e.g., tracking database 302. In some embodiments, prior to or in connection with establishing the rules, an account relationship may be created between the financial institution 407 and the client who establishes the rules, as described above, which may involve depositing client funds in a financial account managed by the financial institution 407 or by another financial institution. In this example, the rules provide for partial payment of goods in a number N of portions, each portion in response to a number N of specified events in the physical supply chain.

A first event in the physical supply chain occurs at step 502, such as a shipment or delivery of goods from one point to another in the physical supply chain 400 as shown in FIG. 4. It is understood that the first event referred to is an event specified in the established rules, such that action is to be taken in response according to the rules. A notification of the occurrence of the first event is sent to the financial institution 407 at step 503. As described above, this notification is performed automatically by a computing device in one embodiment, but may alternatively be performed manually, with or without the use of a computing device. As described above, in this embodiment, the rules specify that a partial payment is to be made upon receiving notification of the first event occurring. Accordingly, once the notification is received, the financial institution 407 transfers a first portion of the payment to the recipient, according to the established rules, at step 504. In this embodiment, the transfer of the first portion of the payment is performed automatically upon receiving the notification. In other words, the transfer is initiated and executed entirely by a computer device, without direct manual initiative. The occurrences of subsequent specified events in the physical supply chain are processed similarly to steps 502–504, through notification and transmission of another portion of the payment. While the process in FIG. 5 described thus far may be used for a financial transaction involving only a single full payment, in this particular embodiment, it will be shown how the payment can be transferred in at least two portions, in response to at least two events in the physical supply chain. The number of payment portions and the number of corresponding events in the physical supply chain 400 is designated by “N” in FIG. 5. The final specified event in the physical supply chain 400 occurs at step 505, fulfilling the established rules to qualify for complete payment. A notification of the final event is sent at step 506, and the final portion of the payment is automatically transferred by the financial institution 407 upon receiving the notification, at step 507.

In the embodiment described above and shown in FIG. 5, the established rules can be renewable, or even self-renewing, to cover future passage of similar or identical goods through the physical supply chain. For example, rules may be established for a first shipment of goods, and may automatically be applied by the financial institution 407 to govern a future shipment of the same goods, so that payments are transferred in the same manner. In another example, the rules may not be renewed unless a notification is received by the financial institution 407 that includes a modification of the rules, such as a change in the agreed-upon payment amount. In another embodiment, each future shipment may require completely new rules.

As an example, the embodiment of the method shown in FIG. 5 can be used to transfer payment for shipments of goods along the physical supply chain 400 as illustrated in FIG. 4. In this embodiment, the established rules may specify that the shipment of the goods 405 from the manufacturer 401 to the distributor 402 qualifies as the first event (step 502), resulting in payment of the first portion of the payment (step 504). Additionally, in this embodiment, a notification may be automatically generated and sent to the financial institution 407 upon scanning of the RFID tag 406 upon shipment and/or delivery of the goods 405. In another embodiment, both the shipment of the goods 405 from the manufacturer 401 and the delivery of the goods 405 to the distributor 402 qualify as separate events resulting in separate notifications and separate portions of the payment. Subsequent shipments and/or deliveries of the goods, such as delivery from the distributor 402 to the retailer 403, may constitute additional events resulting in notifications and transfers of additional portions of the payment. In this embodiment, the final event fulfilling the established rules is the transfer of the goods 405 at the point of sale 404, such as placement of the goods 405 on a showroom floor. Once a notification of this event is received, the financial institution 407 transmits the final portion of the payment to the recipient 409. Accordingly, the established rules are fulfilled. As described above, the rules may be renewable or self-renewing, so that future shipments of goods through the physical supply chain are governed by the same rules. It is understood that additional events in the cash supply chain can qualify as additional or alternate events resulting in transfer of a portion of the payment according to the rules. For example, another action performed at one of the points 401, 402, 403, 404, such as completion of the manufacturing process or sale of the goods, or an action performed by another party not illustrated on the supply chain 400 shown in FIG. 4, may constitute a specified event.

In another embodiment, networking features can be provided for various parties utilizing the transaction processing features described herein. For example, users in the network can receive perks based on their membership in the network and may receive additional perks based on the number or percentage of their supply chain partners that are also in
the network. Such perks can include reduced fees, rewards bonuses, better rates of interest on stored or borrowed money, etc., and may encourage members to invite other business partners to join the network as well. The network can be established in connection with the financial institution 407, and may be configured to require or encourage doing business with the financial institution 407 in connection with network participation. The centralized tracking system 101 may also operate in conjunction with the network.

As stated above, FIGS. 4 and 5 illustrate examples of one or more aspects of systems and methods for processing a transaction in connection with a physical supply chain. The steps of the methods described above can be accomplished by means and/or components contained within the cash supply chain, the physical supply chain, and/or within a financial institution, such as the centralized tracking system 101, a computer device connected to the centralized tracking system 101, and the memories and processors thereof, and may also be accomplished by non-computer means, such as by institutional employees. Other components of a cash supply chain, physical supply chain, or financial institution may also constitute means for accomplishing aspects of the present invention, as understood by those skilled in the art. It is understood that one entity may not perform each and every aspect of the methods described herein, and that aspects may be outsourced to one or more other entities.

As will be appreciated by one of skill in the art upon reading the following disclosure, various aspects described herein may be embodied as a method, a computer program product or computer readable medium, or a system, such as a physical supply system, a financial institution, a computer system, or other type of system.

Aspects of the present invention provide many benefits not provided by prior systems and methods for processing transactions. For example, the automatic payment features and other features described above may allow transactions to be processed in a faster and more timely manner than previous systems and methods. Likewise, transactions might be processed more efficiently, and possibly even without direct human involvement and related expenses. Additional potential benefits include smaller numbers of unresolved transactions, better predictive payment abilities, fewer delayed collections, improved servicing, less necessary research, fewer necessary adjustments, efficiency through reuse of the rules between and among customers, more easily facilitated agreements and terms, ability to assign specialized bank personnel to assist in the party agreements, potential perks to clients through network features, improved client retention, automated optimization of inventory throughout the supply chain, and individual and aggregated reporting ability. Still other potential benefits and advantages exist and are apparent to those skilled in the art.

Several alternative embodiments and examples have been described and illustrated herein. A person of ordinary skill in the art would appreciate the features of the individual embodiments, and the possible combinations and variations of the components. A person of ordinary skill in the art would further appreciate that any of the embodiments could be provided in any combination with the other embodiments disclosed herein. It is further understood that the invention may be in other specific forms without departing from the spirit or central characteristics thereof. The present examples therefore are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein. The term “plurality,” as used herein, indicates any number greater than one, either disjunctively or conjunctively, as necessary, up to an infinite number. Accordingly, while the specific examples have been illustrated and described, numerous modifications may be implemented without significantly departing from the spirit of the invention.

What is claimed is:

1. A computer-assisted method comprising:
   storing, in memory, a first rule and a second rule for automatic transfer of funds in response to receiving notification of at least a first event and a second event in a physical supply chain, at least one of the first and second events being selected from a limited list of different events, wherein the funds comprise at least a first portion and a second portion of an agreed-upon payment to a party for sale of physical goods in a financial transaction related to the party;
   receiving, by a computing device in communication with the memory, a first notification of the first event in the physical supply chain, wherein the first event comprises a change in financial status of a unit of physical goods along the physical supply chain;
   automatically transferring the first portion of the agreed-upon payment to the party, by the computing device, in response to the first notification, according to the first rule;
   receiving, by the computing device, a second notification of the second event in the physical supply chain, wherein the second event comprises a change in financial status of the unit of physical goods along the physical supply chain;
   and automatically transferring the second portion of the agreed-upon payment to the party, by the computing device, in response to the second notification, according to the second rule.

2. The method of claim 1, wherein the first notification is an electronic notification.

3. The method of claim 1, wherein the first or second notification is generated automatically in response to electronic detection by an electronic detection device selected from the group consisting of: an RFID scanner, a bar code scanner, and an internal system transaction code detector.

4. The method of claim 1, wherein the first event is a delivery of physical goods from one point to another point in the physical supply chain.

5. The method of claim 1, wherein the first and second changes in financial status of the physical goods are selected from a group consisting of: shipment of at least some of the physical goods, delivery of at least some of the physical goods, advancement of at least some of the physical goods on a retailer’s storefront, confirmed satisfaction of quality control standards for at least some of the physical goods, and reaching a specified inventory level related to the physical goods.

6. The method of claim 1, wherein the first and second rules are established by an agreement between the party and a second party involved in the transfer.

7. The method of claim 1, wherein the first rule and the second rule are received as input by the computing device via a form made available by the computing device for access, and wherein the form also includes a selection of the at least one of the first event and the second event from the limited list of different events.
8. A computer readable medium comprising computer-executable instructions configured to cause a computing device to perform:

- receiving an electronic notification of a first event in a physical supply chain, wherein the first event is related to a party and comprises a change in physical status of a unit of physical goods along the physical supply chain;
- automatically transmitting a first signal to transfer a first portion of an agreed-upon payment to the party, in response to the notification;
- receiving, a second electronic notification of a second event in the physical supply chain, wherein the second event is related to the party and to the first event and comprises a second change in physical status of the unit of physical goods along the physical supply chain; and
- automatically transferring a second portion of the agreed-upon payment to the party in response to the second notification,

wherein at least one of the first and second events is selected from a list of different events.

9. The computer readable medium of claim 8, wherein the first event is a delivery of physical goods from one point to another point in the physical supply chain.

10. The computer readable medium of claim 8, wherein the first and second portions are transferred pursuant to a pre-existing agreement between the party and a second party involved in the transfer.

11. A computer-assisted method comprising:

- receiving input, by a computing device, to provide control to create a first rule for automatic transfer of funds to a party in response to receiving a first notification of a first specified event that comprises a change in physical status of a unit of physical goods in a physical supply chain, and to create a second rule for automatic transfer of funds to the party in response to receiving a second notification of a second specified event that comprises a second change in physical status of the unit of physical goods in the physical supply chain, the first specified event and the second specified event being related to the party, wherein the input is received via a form made available by the computing device for access, and wherein the input includes a selection of the first specified event and the second specified event from a list of different events;
- automatically transmitting a first signal, by the computing device, to transfer a first portion of the funds to the party in response to receiving the first notification, according to the first rule; and
- automatically transmitting a second signal, by the computing device, to transfer a second portion of the funds to the party in response to receiving the second notification, according to the second rule.

12. The method of claim 11, wherein the relationship is an account relationship with a second party, and the funds are controlled by the second party pursuant to the account relationship.

13. The method of claim 11, wherein the first specified event is a delivery of physical goods from one point to another point in the physical supply chain.

14. The method of claim 11, wherein the first and second rules are created based on a pre-existing agreement between the party and a second party involved in the transfer.

15. The method of claim 14, wherein the first specified event is a delivery of physical goods to the second party, and the funds are transferred to the party.

16. A computer readable medium comprising computer-executable instructions configured to cause a computing device to perform:

- providing for creation of first rule for automatic transfer of funds to a party, in response to receiving a first notification of a first specified event that comprises a change in physical status of a unit of physical goods in a physical supply chain, and for creation of a second rule for automatic transfer of funds to the party in response to receiving a second notification of a second specified event that comprises a second change in physical status of the unit of physical goods in the physical supply chain, wherein the creation of the first and second rules is controllable via a form made available by the computing device for access, and wherein the creation of the first and second rules includes a selection of the first and second specified events from a list of different events;
- automatically transmitting a first signal to transfer a first portion of the funds to the party in response to receiving the first notification, according to the first rule; and
- automatically transmitting a second signal to transfer a second portion of the funds to the party in response to receiving the second notification, according to the second rule.

17. The computer readable medium of claim 16, wherein the first specified event is a delivery of physical goods from one point to another point in the physical supply chain.

18. The computer readable medium of claim 16, wherein the first and second changes in status of the physical goods are selected from a group consisting of: shipment of at least some of the physical goods, delivery of at least some of the physical goods, advancement of at least some of the physical goods on a retailer’s storefront, confirmed satisfaction of quality control standards for at least some of the physical goods, and reaching a specified inventory level related to the physical goods.

19. The computer readable medium of claim 16, wherein the first and second rules are created based on a pre-existing agreement between the party and a second party involved in the transfer.

20. The computer readable medium of claim 19, wherein the first specified event is a delivery of physical goods to the second party, and the first portion of the funds is transferred to the party.

21. A computer-assisted method comprising:

- storing, in memory, a database containing a plurality of rules relating to a plurality of parties, the rules comprising a first rule for automatic transfer of funds in response to receiving a first notification of a first event in a physical supply chain, the first event being related to a first party, and a second rule for taking a specified action other than transfer of funds, in response to receiving a second notification of a second event in a second physical supply chain, the second event being related to a second party;
- receiving, by a computing device in communication with the memory, the first notification of the first event in the first physical supply chain;
automatically transferring funds related to the first party, 
by the computing device, in response to the second notifi-
cation, according to the first rule; 
receiving, by the computing device, the second notification 
of the second event in the second physical supply chain; 
and 
automatically transmitting a signal to initiate the specified 
action, by the computing device, in response to the sec-
ond notification, according to the first rule.

22. The method of claim 21, wherein the first rule is 
received as input by the computing device via a form made 
available by the computing device for access by the first party, 
and the second rule is received as input by the computing 
device via the form made available by the computing device 
for access by the second party.

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