



US011030878B2

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

(10) **Patent No.:** **US 11,030,878 B2**

(45) **Date of Patent:** **Jun. 8, 2021**

(54) **TOOL SAFETY SYSTEM**

2005/006 (2013.01); A45F 2200/0575
(2013.01); B25H 3/00 (2013.01)

(71) Applicant: **Smart Harness Systems, LLC**,
Cypress, TX (US)

(58) **Field of Classification Search**
CPC G08B 21/185
See application file for complete search history.

(72) Inventors: **James David Dillon**, Liberty, TX (US);
Adam Laubach, College Station, TX
(US)

(56) **References Cited**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

U.S. PATENT DOCUMENTS

(21) Appl. No.: **16/786,945**

2009/0078505 A1* 3/2009 Casebolt A62B 35/0093
182/231
2017/0065065 A1* 3/2017 Brewner A45F 5/021

(22) Filed: **Feb. 10, 2020**

* cited by examiner

(65) **Prior Publication Data**

US 2020/0394891 A1 Dec. 17, 2020

Primary Examiner — Travis R Hunnings

(74) Attorney, Agent, or Firm — Shannon Warren

Related U.S. Application Data

(60) Provisional application No. 62/803,458, filed on Feb.
9, 2019.

(57) **ABSTRACT**

A tether tracking system configured to secure and monitor a
one or more tools to prevent drops and accidents by a
worker. The tether tracking system comprises a base portion,
a two or more straps, a one or more hooks, a tool strap and
a one or more hook anchors. The two or more straps
comprise at least a first strap and a second strap. The first
strap comprises a first end and a second end. The second
strap comprises a first end and a second end. The two or
more straps are attached to the base portion with the second
end of the first strap and the second end of the second strap
attached to the base portion. The first end of the second strap
is attached to the tool strap. The tool strap is configured to
selectively attach to one among a one or more tool tethers.

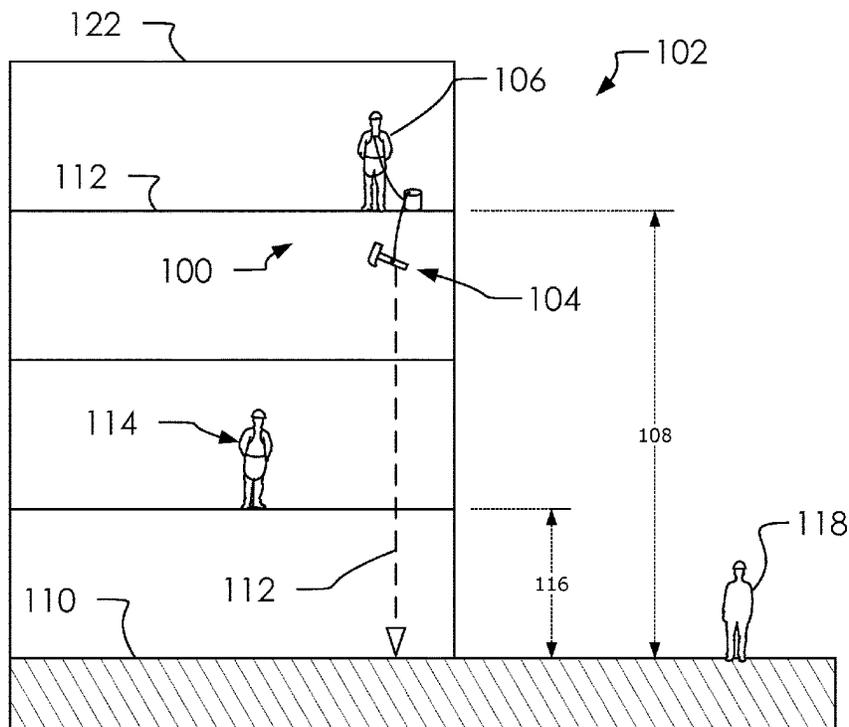
(51) **Int. Cl.**

G08B 21/18 (2006.01)
G08B 21/02 (2006.01)
G08B 3/10 (2006.01)
A45F 5/00 (2006.01)
G08B 25/00 (2006.01)
B25H 3/00 (2006.01)

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

CPC **G08B 21/185** (2013.01); **A45F 5/00**
(2013.01); **G08B 3/10** (2013.01); **G08B 21/02**
(2013.01); **G08B 25/00** (2013.01); **A45F**

1 Claim, 9 Drawing Sheets



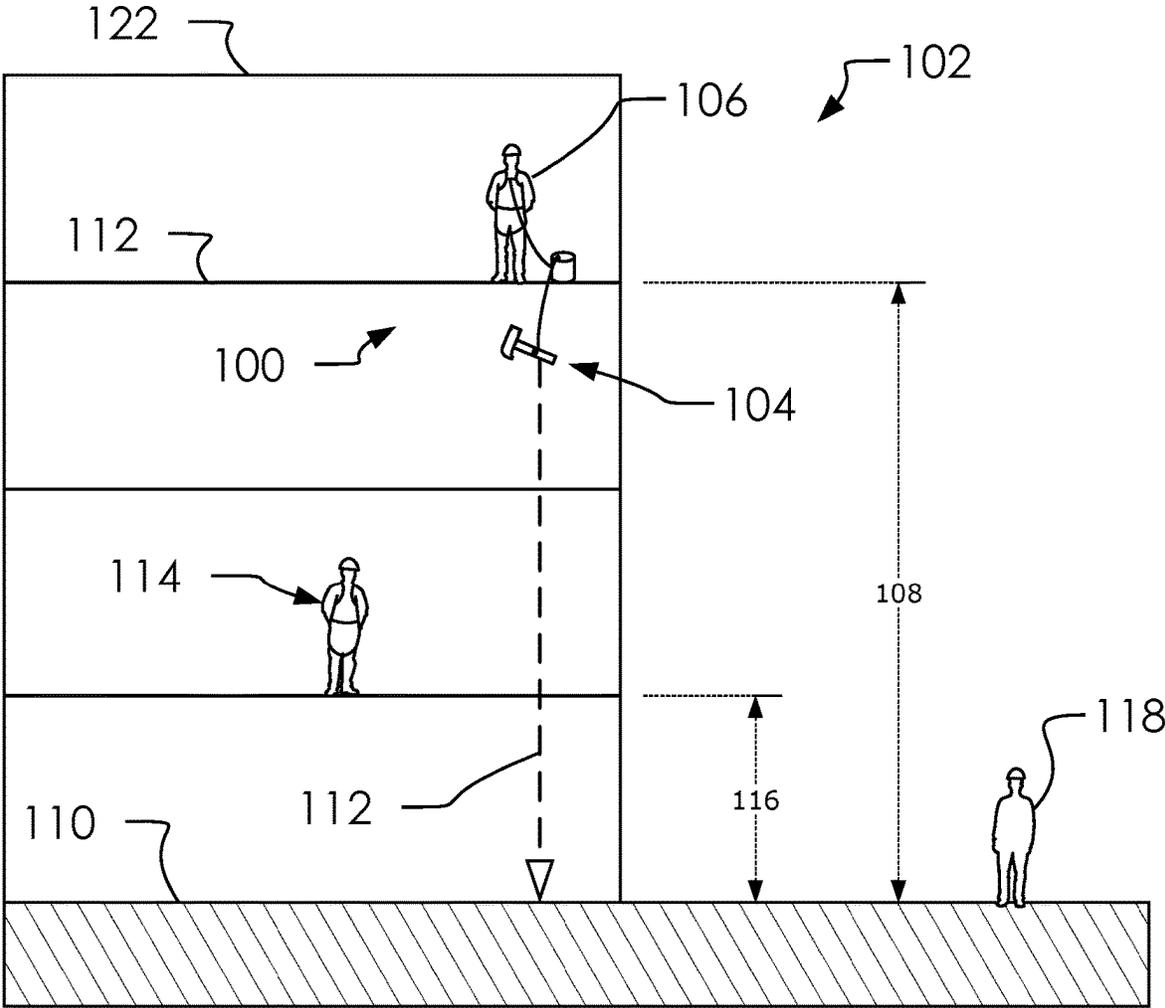


FIG. 1

PRIOR ART

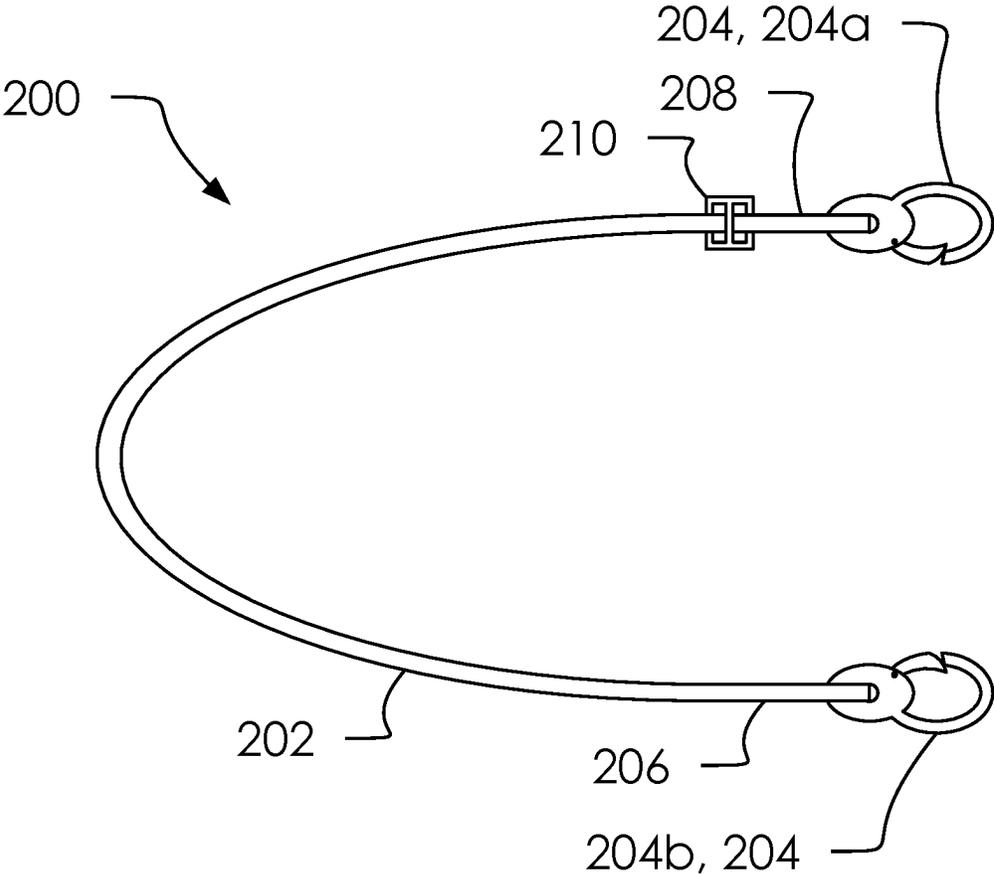


FIG. 2

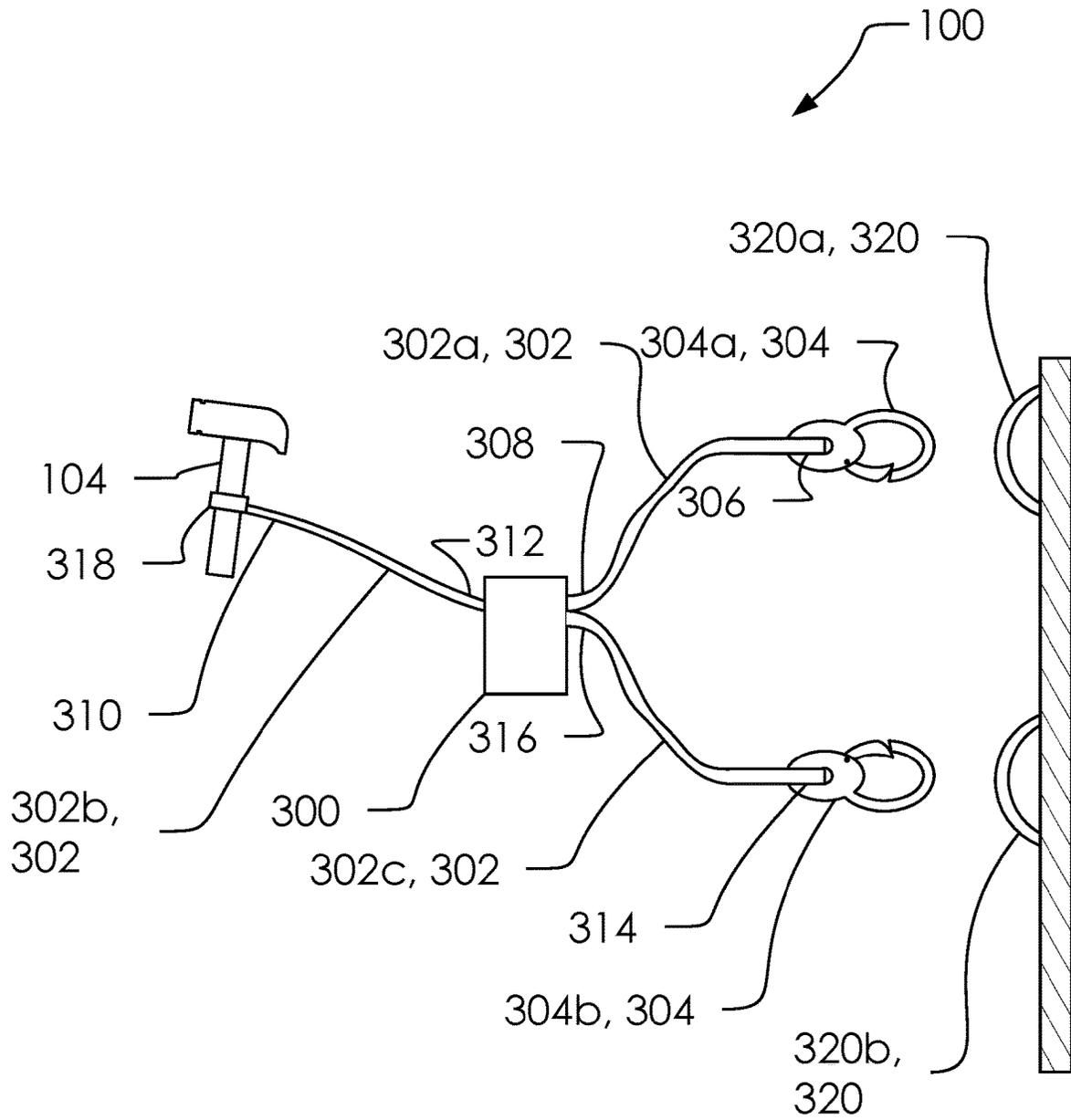


FIG. 3

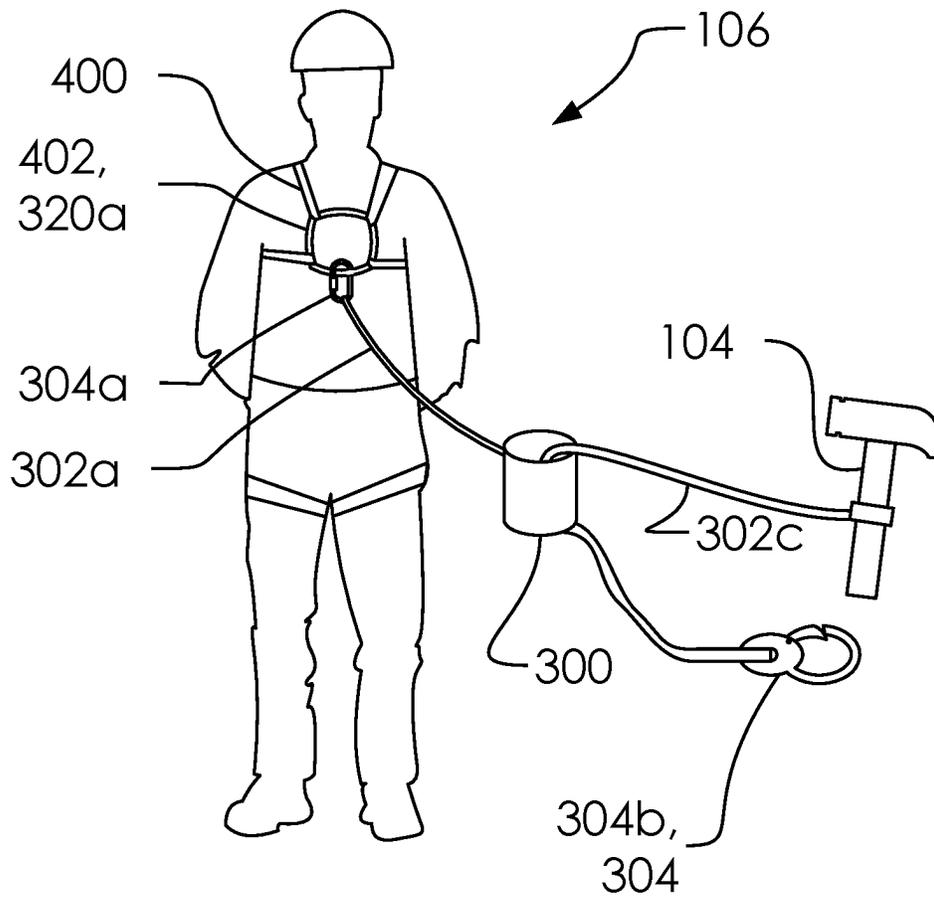


FIG. 4

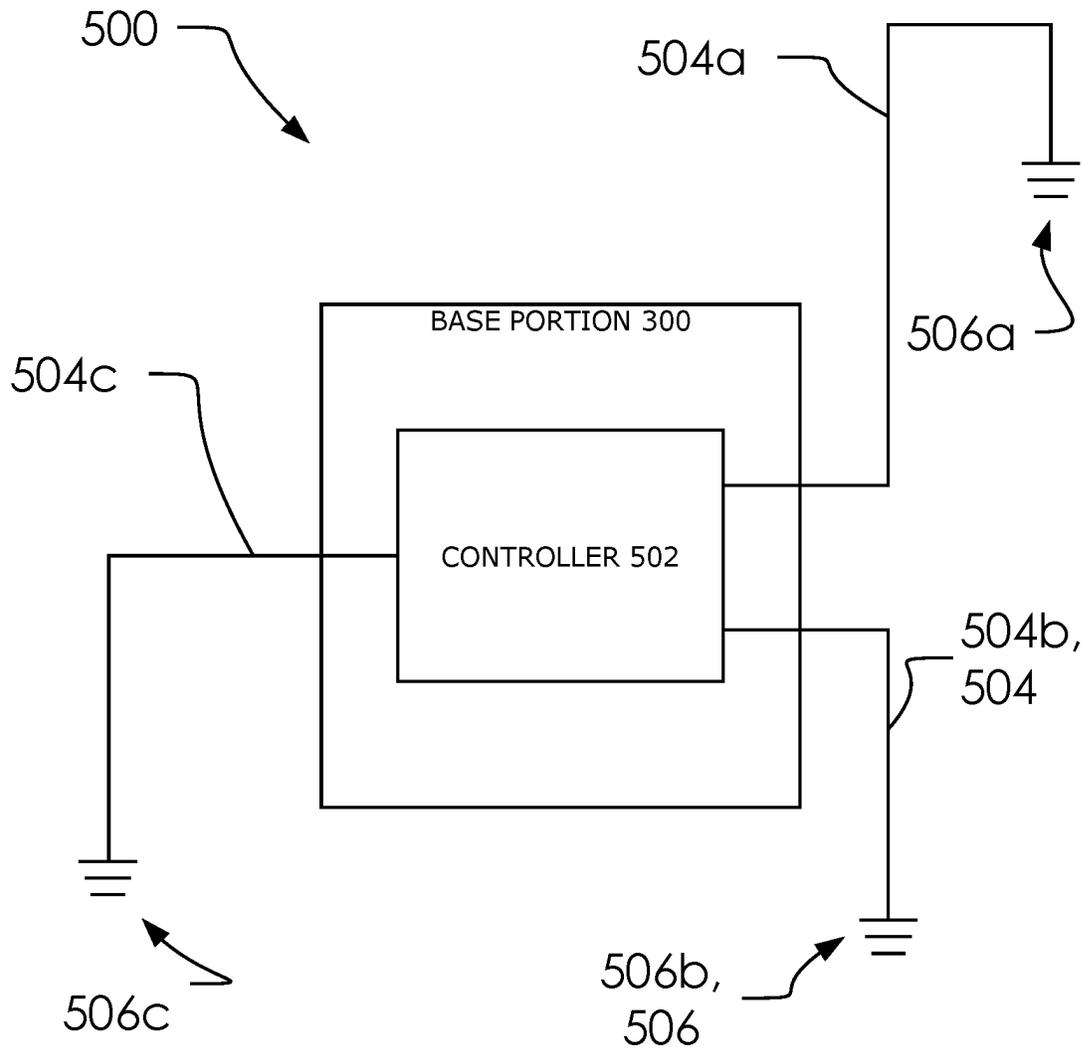


FIG. 5

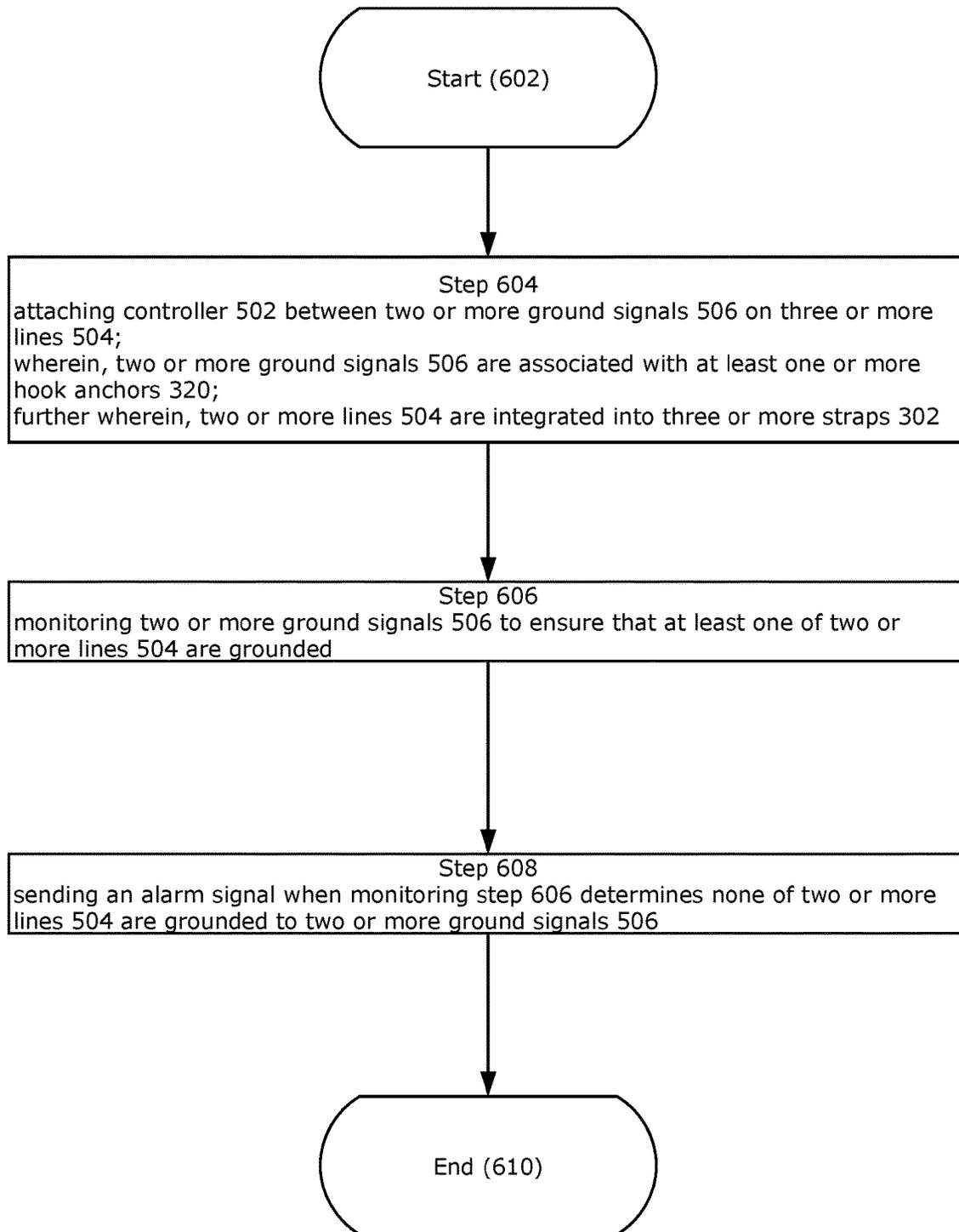


FIG. 6

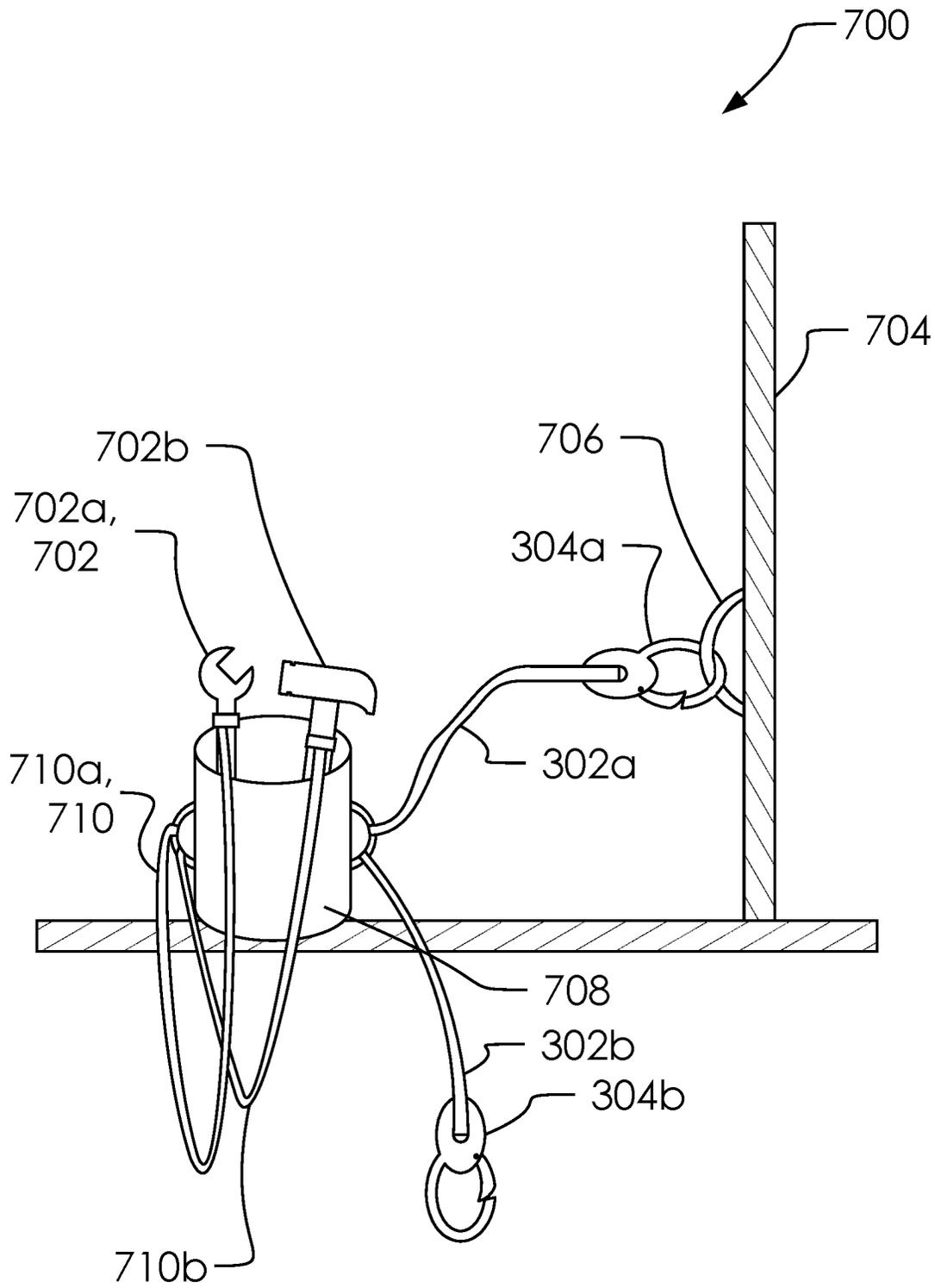


FIG. 7

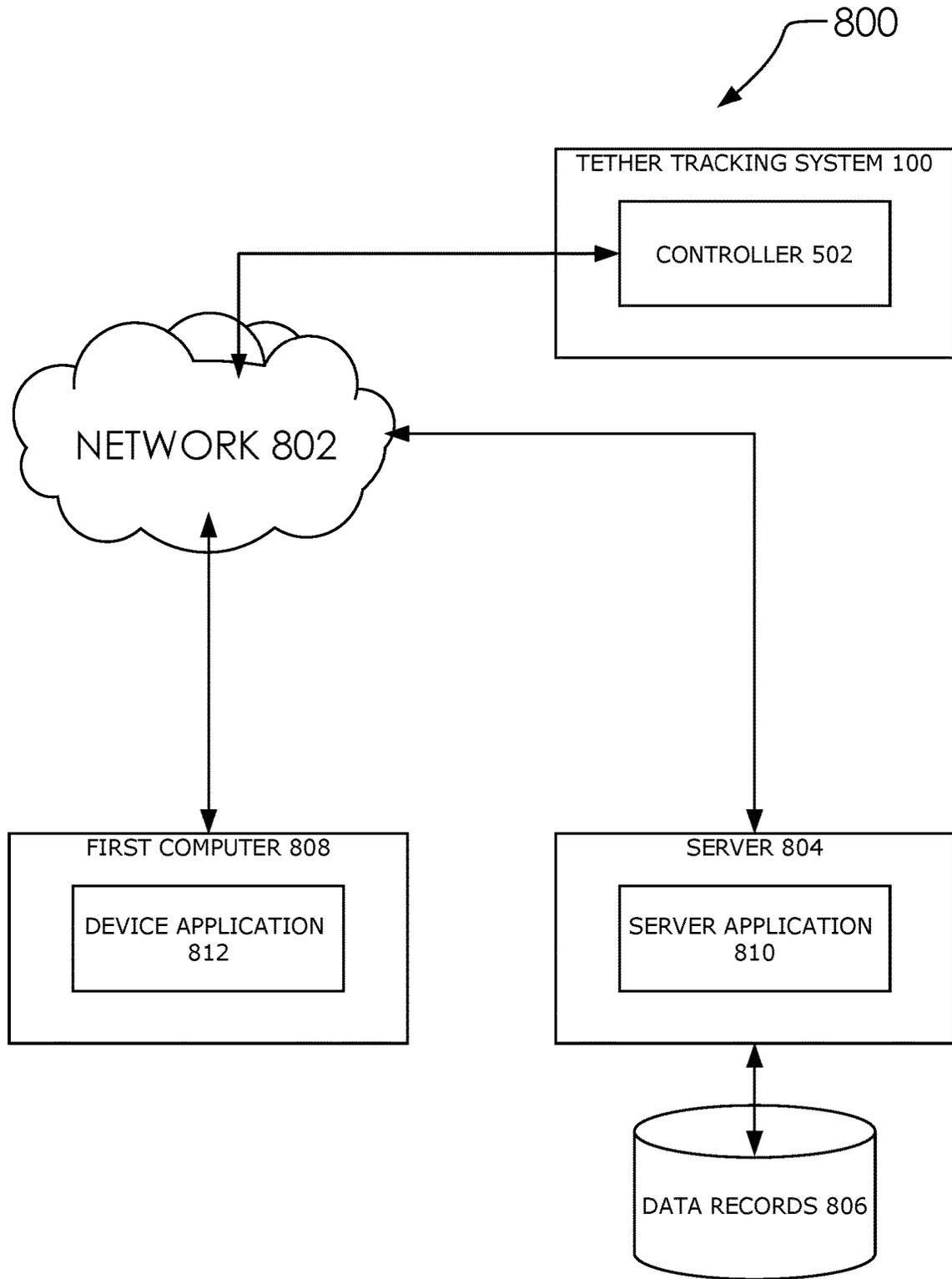


FIG. 8

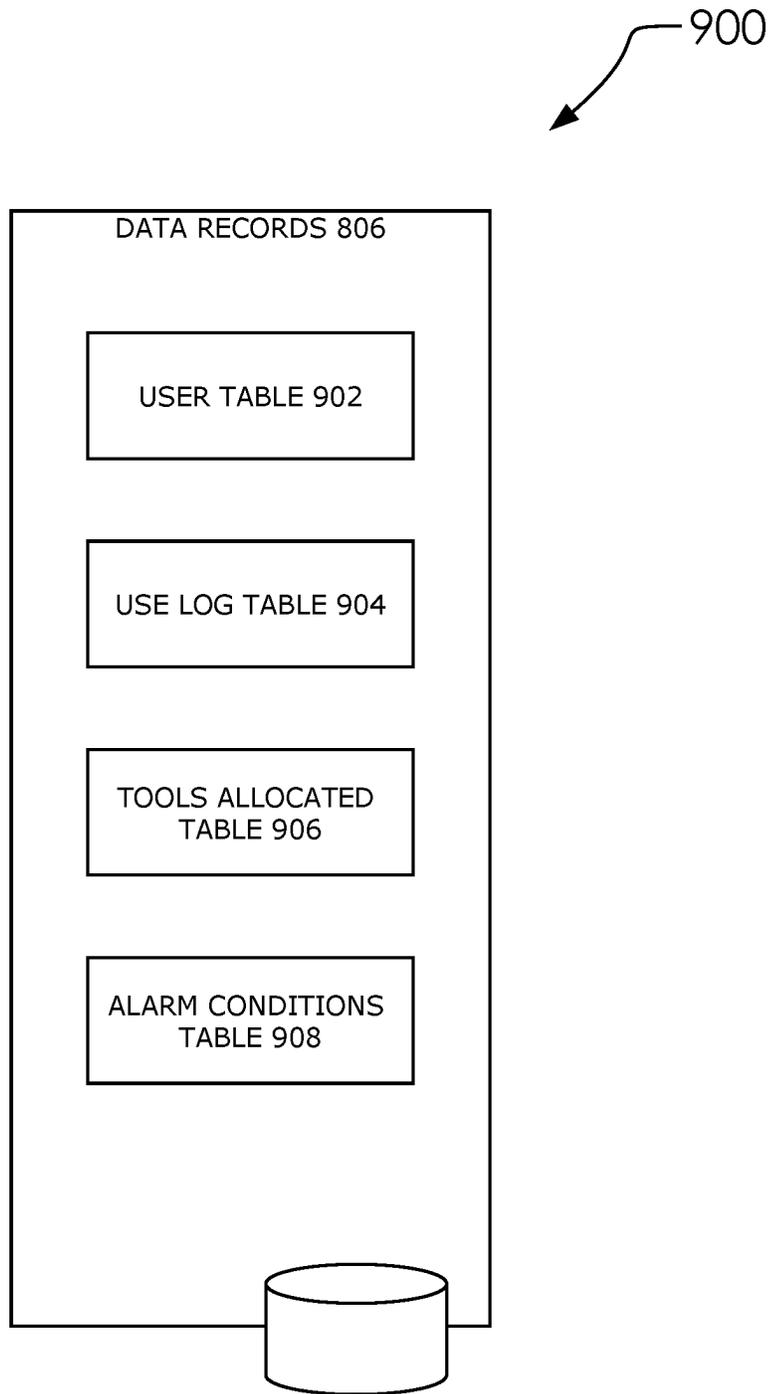


FIG. 9

1

TOOL SAFETY SYSTEM**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application claims benefit to U.S. Patent Application No. 62/803,458 filed on Feb. 9, 2019.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT (IF APPLICABLE)

Not applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX (IF APPLICABLE)

Not applicable.

BACKGROUND OF THE INVENTION

No prior art is known to the Applicant

BRIEF SUMMARY OF THE INVENTION

A tether tracking system configured to secure and monitor a one or more tools to prevent drops and accidents by a worker. Said tether tracking system comprises a base portion, a two or more straps, a one or more hooks, a tool strap and a one or more hook anchors. Said two or more straps comprise at least a first strap and a second strap. Said first strap comprises a first end and a second end. Said second strap comprises a first end and a second end. Said two or more straps are attached to said base portion with said second end of said first strap and said second end of said second strap attached to said base portion. Said first end of said second strap is attached to said tool strap. Said tool strap is configured to selectively attach to one among a one or more tool tethers. Said one or more hook anchors comprise at least a first hook anchor. Said one or more hooks comprise at least a first hook. Said first end of said first strap is attached to said first hook. each among said one or more hooks are configured to selectively attach to said one or more hook anchors. Said tether tracking system is configured to monitor safety conditions of said one or more tools by: attaching a controller between a two or more ground signals on a two or more lines. monitoring said two or more ground signals to ensure that at least one of said two or more lines are grounded. sending an alarm signal with said controller when a monitoring step determines none of said two or more lines are grounded to said two or more ground signals. Said two or more ground signals are associated with at least said one or more hook anchors. Said two or more lines are integrated into said two or more straps.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 illustrates a perspective overview a worksite 102 with a worker 106 dropping a tool 104 attached to a tether tracking system 100.

FIG. 2 illustrates a perspective overview of a prior art tether 200.

FIG. 3 illustrates a perspective overview of said tether tracking system 100.

2

FIG. 4 illustrates a perspective overview of said worker 106 with said tether tracking system 100 attached to a harness system 400.

FIG. 5 illustrates a sensor circuit 500 of said tether tracking system 100.

FIG. 6 illustrates a method of use 600 for said tether tracking system 100.

FIG. 7 illustrates a perspective overview of a tool tether configuration 700 of said tether tracking system 100.

FIG. 8 illustrates a network diagram 800.

FIG. 9 illustrates a one or more data tables 900 managed by said server application 810.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 illustrates a perspective overview a worksite 102 with a worker 106 dropping a tool 104 attached to a tether tracking system 100.

In one embodiment, said tether tracking system 100 can selectively secure one or a plurality of said tool 104 to said worker 106.

For many construction workers, working at a first elevation 108 above a ground 110 can comprise a risky undertaking. For example, where construction is conducted at a first work location 112 at said first elevation 108, a lower elevation worker 114 at a second elevation 116 being below said first work location 112 might be hit by said tool 104 when falling toward said ground 110 along a falling path 120.

In one embodiment, a supervisor 118 can monitor conditions at said worksite 102 including the status of said tether tracking system 100, as discussed herein.

In one embodiment, said worksite 102 can comprise a scaffolding structure 122, as is known in the art.

FIG. 2 illustrates a perspective overview of a prior art tether 200.

The prior art has developed means for securing said tool 104 to said worker 106 using said prior art tether 200. In one embodiment, said prior art tether 200 can comprise a strap portion 202, a two hook assemblies 204 (comprising a first hook assembly 204a and a second hook assembly 204b) attached at a first end 206 and a second end 208 of said strap portion 202, and an adjustment buckle 210, as illustrated.

Said prior art tether 200 is designed to attach to attach said tool 104 to said worker 106 in order to prevent injuries to said lower elevation worker 114. However, in the real world, said worker 106 tend to take shortcuts and fail to keep said tool 104 tethered at all times. Indeed, injuries occur and near misses happen all the time in industrial construction settings. Human distraction and laziness tend to cause more injuries than equipment failure. On objective of said tether tracking system 100 is to compensate for these human errors.

FIG. 3 illustrates a perspective overview of said tether tracking system 100.

In one embodiment, said tether tracking system 100 can comprise a base portion 300, a two or more straps 302, a one or more hooks 304, a first end 306, a second end 308, a first end 310, a second end 312, a first end 314, a second end 316, a tool strap 318 and a one or more hook anchors 320. In one embodiment, said two or more straps 302 can comprise a first strap 302a, a second strap 302b and a third strap 302c. Said one or more hooks 304 can comprise a first hook 304a and a second hook 304b. Said one or more hook anchors 320 can comprise a first hook anchor 320a and a second hook anchor 320b.

Each of said two or more straps **302** are configured to attach to said base portion **300** with said second end **308**, said second end **312** and said second end **316**, respectively.

Further, said first end **306** of said first strap **302a** can attach to said first hook **304a**; said first end **310** of said second strap **302b** can attach to said second hook **304b**; and said first end **314** of said third strap **302c** can attach to said tool strap **318**.

Accordingly, said tool strap **318**, said first hook anchor **320a** and said second hook anchor **320b** can be attached to one another with said base portion **300** and said two or more straps **302**, as illustrated.

In one embodiment, said two or more straps **302** can comprise a strong fabric strap, as is known in the art. However, unlike said prior art tether **200**, in one embodiment, said two or more straps **302** can have an added feature of electronic circuits, as discussed below.

FIG. **4** illustrates a perspective overview of said worker **106** with said tether tracking system **100** attached to a harness system **400**.

In one embodiment, said harness system **400** can comprise a safety harness, as is known in the art. In one embodiment, said harness system **400** can comprise an inductive anchor **402** to function as said one or more hook anchors **320**. In one embodiment, all metallic portions of said harness system **400** can comprise said inductive anchor **402**. In one embodiment, said inductive anchor **402** can comprise an enclosed loop where portions of said harness system **400** tie together. In one embodiment, said inductive anchor **402** is adapted to receive a portion of one among said two hook assemblies **204**, such as said first hook assembly **204a**, as illustrated.

FIG. **5** illustrates a sensor circuit **500** of said tether tracking system **100**.

In one embodiment, said sensor circuit **500** can comprise a controller **502**, a two or more lines **504** and a two or more ground signals **506**. Said two or more lines **504** can comprise a first line **504a**, a second line **504b** and a third line **504c**. Said two or more ground signals **506** can comprise a first ground signal **506a**, a second ground signal **506b** and a third ground signal **506c**.

In one embodiment, said base portion **300** can be used to monitor conditions of said one or more hooks **304** and said tool strap **318**. In one embodiment, said two or more straps **302** can comprise said two or more lines **504** within the strap material; wherein, said first strap **302a** and said first line **504a**, said second strap **302b** and said second line **504b**, and said third strap **302c** and said third line **504c** can be associated with one another. In one embodiment, said two or more ground signals **506** can be created by attaching said one or more hook anchors **320** and/or said tool strap **318** to said one or more hook anchors **320** or said tool **104**.

In one embodiment, said controller **502** can monitor said two or more lines **504** for a ground (such as said two or more ground signals **506**) to determine if said one or more hook anchors **320** are attached to said one or more hooks **304** or, possibly, said tool strap **318**. However, said tool strap **318** may or may not be configured for this circuit analysis, pursuant to the requirements of said worker **106** or other end users associated with said tether tracking system **100**.

In one embodiment, said controller **502** can be integrated into said base portion **300**, as illustrated. In another embodiment, said controller **502** can be located anywhere between said two or more ground signals **506** on said sensor circuit **500**.

In one embodiment, said two or more ground signals **506** can comprise said first ground signal **506a** and said second ground signal **506b** as between said two hook assemblies **204**.

Accordingly, said tether tracking system **100** can be configured to determine whether a portion of said one or more hooks **304** are attached to a portion of said one or more hook anchors **320**.

FIG. **6** illustrates a method of use **600** for said tether tracking system **100**.

Said method of use **600** can comprise a starting step **602**, a configuration step **604**, a monitoring step **606**, an alarming step **608**, and an end step **610**.

In one embodiment, said configuration step **604** can comprise attaching said controller **502** between said two or more ground signals **506** on said two or more lines **504**; wherein, said two or more ground signals **506** are associated with at least said one or more hook anchors **320**; further wherein, said two or more lines **504** are integrated into said two or more straps **302**.

Said two or more ground signals **506** can be grounded when said one or more hook anchors **320** are in contact with a metallic structure such as said scaffolding structure **122**, said one or more hook anchors **320**, or similar.

Said monitoring step **606** can comprise monitoring said two or more ground signals **506** to ensure that at least one of said two or more lines **504** are grounded.

Said alarming step **608** can comprise said controller **502** sending an alarm signal when said monitoring step **606** determines none of said two or more lines **504** are grounded to said two or more ground signals **506**.

In one embodiment, said alarming step **608** can comprise an audible alarm, a digital alarm carried over a network to a server, a signal to a supervisor or colleague, or other as may be expected in the art.

FIG. **7** illustrates a perspective overview of a tool tether configuration **700** of said tether tracking system **100**.

Said tool tether configuration **700** can comprise a bag **708** and a one or more tool tethers **710**. Said bag **708** can be configured to safely hold a one or more tools **702** each attached to said one or more tool tethers **710**. In one embodiment, said tool tether configuration **700** of said tether tracking system **100** can be configured to attach said bag **708** to a mounted hook **706** of a mounting structure **704**; and said one or more tools **702** attached to said bag **708** with said one or more tool tethers **710**, as illustrated.

In one embodiment, said one or more tools **702** can comprise first tool **702a** and second tool **702b**.

Further, said bag **708** can house said controller **502** and thereby function as said base portion **300**. In one embodiment, said two or more straps **302** and said one or more tool tethers **710** can attach to said bag **708**. In one embodiment, said tool tether configuration **700** can confirm at least one among said one or more hooks **304** are attached to either said worker **106** or said mounted hook **706** of said mounting structure **704**. In one embodiment, said mounted hook **706** of said mounting structure **704** can be grounded.

FIG. **8** illustrates a network diagram **800**.

In one embodiment, said network diagram **800** can comprise a network **802**, a server **804**, a data records **806**, and a first computer **808**.

In one embodiment, said tether tracking system **100** can communicate oversaid network diagram **800** with said server **804** and/or said first computer **808**. In one embodiment, said first computer **808** can be associated with said supervisor **118** with a responsibility to care for said worker **106** and/or said worksite **102**.

In one embodiment, said server **804** can store records associated with said tether tracking system **100** and said worker **106** in said data records **806**. Said server **804** can comprise a server application **810** configured to communicate with said data records **806** and said first computer **808**. Said server **804** and said server application **810** can be configured to send to said first computer **808** according to user preferences.

Said first computer **808** can comprise a device application **812**. In one embodiment, said server application **810** and said device application **812** can communicate with one another over said network **802**, as is known in the art. In one embodiment, said device application **812** can comprise an app on a smart device, or similar, or a messaging app for receiving noncomplex text messages.

FIG. 9 illustrates a one or more data tables **900** managed by said server application **810**.

In one embodiment, said one or more data tables **900** can comprise an user table **902**, an use log table **904**, a tools allocated table **906**, and an alarm conditions table **908**. Said user table **902** can comprise a list of users, such as said worker **106**, said lower elevation worker **114** and said supervisor **118**. Said use log table **904** can comprise records related to actions of the users. Said tools allocated table **906** can comprise a list of tools (such as said tool **104**, said first tool **702a** and said second tool **702b**) which are or have been associated with individual users. Said alarm conditions table **908** can comprise a record of alarm conditions associated with events determined by said method of use **600** or similar analysis of said controller **502**, said server application **810** or said device application **812**.

The following sentences are generated from the claims and represent at least one embodiment of the current disclosure:

Said tether tracking system **100** configured to secure and monitor said one or more tools **702** to prevent drops and accidents by said worker **106**. Said tether tracking system **100** comprises said base portion **300**, said two or more straps **302**, said one or more hooks **304**, said tool strap **318** and said one or more hook anchors **320**. Said two or more straps **302** comprise at least said first strap **302a** and said second strap **302b**. Said first strap **302a** comprises said first end **306** and said second end **308**. Said second strap **302b** comprises said first end **310** and said second end **312**. Said two or more straps **302** can be attached to said base portion **300** with said second end **308** of said first strap **302a** and said second end **312** of said second strap **302b** attached to said base portion **300**. Said first end **310** of said second strap **302b** can be attached to said tool strap **318**. Said tool strap **318** can be configured to selectively attach to one among said one or more tool tethers **710**. Said one or more hook anchors **320** comprise at least said first hook anchor **320a**. Said one or more hooks **304** comprise at least said first hook **304a**. Said first end **306** of said first strap **302a** can be attached to said first hook **304a**. each among said one or more hooks **304** can be configured to selectively attach to said one or more hook anchors **320**. Said tether tracking system **100** can be configured to monitor safety conditions of said one or more tools **702** by: attaching said controller **502** between said two or more ground signals **506** on said two or more lines **504**. monitoring said two or more ground signals **506** to ensure that at least one of said two or more lines **504** can be grounded. sending an alarm signal with said controller **502** when said monitoring step **606** determines none of said two

or more lines **504** can be grounded to said two or more ground signals **506**. wherein, said two or more ground signals **506** can be associated with at least said one or more hook anchors **320**. Said two or more lines **504** can be integrated into said two or more straps **302**.

Various changes in the details of the illustrated operational methods are possible without departing from the scope of the following claims. Some embodiments may combine the activities described herein as being separate steps. Similarly, one or more of the described steps may be omitted, depending upon the specific operational environment the method is being implemented in. It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments may be used in combination with each other. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms “including” and “in which” are used as the plain-English equivalents of the respective terms “comprising” and “wherein.”

The invention claimed is:

1. A tether tracking system configured to secure and monitor a one or more tools to prevent drops and accidents by a worker, wherein:

said tether tracking system comprises a base portion, a two or more straps, a one or more hooks, a tool strap and a one or more hook anchors;

said two or more straps comprise at least a first strap and a second strap;

said first strap comprises a first end and a second end;

said second strap comprises a first end and a second end;

said two or more straps are attached to said base portion with said second end of said first strap and said second end of said second strap attached to said base portion; said first end of said second strap is attached to said tool strap;

said tool strap is configured to selectively attach to one among a one or more tool tethers;

said one or more hook anchors comprise at least a first hook anchor;

said one or more hooks comprise at least a first hook;

said first end of said first strap is attached to said first hook;

each among said one or more hooks are configured to selectively attach to said one or more hook anchors;

said tether tracking system is configured to monitor safety conditions of said one or more tools by:

attaching a controller between a two or more ground signals on a two or more lines;

monitoring said two or more ground signals to ensure that at least one of said two or more lines are grounded;

sending an alarm signal with said controller when a monitoring step determines none of said two or more lines are grounded to said two or more ground signals;

wherein, said two or more ground signals are associated with at least said one or more hook anchors; and said two or more lines are integrated into said two or more straps.